PB83-150508

Flow Reduction
Developing a Public Information Program

INTASA, Inc.
Menlo Park, CA

Prepared for

Environmental Protection Agency
Washington, DC

Mar 82

U.S. Department of Commerce
National Technical Information Service
NTIS

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.

2.

3. RECIPIENT'S ACCESSION NO. PB83 150508

4. TITLE AND SUBTITLE
"Flow Reduction Developing a Public
Information Program"

5. REPORT DATE August 1982

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
US EPA
Facility Requirements Division (WH-595)
401 M Street, SW
Washington, D.C. 20460

10. PROGRAM ELEMENT NO. 2BG 647

11. CONTRACT/GRANT NO.

12. SPONSORING AGENCY NAME AND ADDRESS
Office of Water Program Operations
US Environmental Protection Agency
Washington, DC 20460

13. TYPE OF REPORT AND PERIOD COVERED

14. SPONSORING AGENCY CODE 700/02

15. SUPPLEMENTARY NOTES

16. ABSTRACT

w the report

Flow Reduction: Developing a Public Information Program, pertains to wastewater flow reduction analysis and program planning. With increading numbers of communities becoming interested int the potential benefits of flow reduction, and with the introdiction of flow reduction analysis requirements into the treatment facilities Planning (Step 1) phase of EPA's Construction Grants Program, a need was felt to provide guidance on flow reduction analysis procedures and on developing community programs.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Flow Reduction	Public Information Program	

18. DISTRIBUTION STATEMENT

19. SECURITY CLASS *(This Report)*

20. SECURITY CLASS *(This page)*

21. NO. OF PAGES

22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

United States
Environmental Protection
Agency

Office of Water
Program Operations (WH-546)
Washington DC 20460

August 1982

PB83-150508

EPA

Flow Reduction

Developing A Public Information Program

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Final Report Contract No. 68-01-6052

FLOW REDUCTION:
DEVELOPING A PUBLIC INFORMATION PROGRAM

March 1982

Prepared For:

U.S. Environmental Protection Agency
Office of Water Program Operations
Facility Requirements Division

Prepared By:

INTASA, Inc.
1030 Curtis Street
Menlo Park, CA 94025

PREFACE

The report

Flow Reduction: Developing a Public Information Program, is the third volume ~~of a~~ three-volume series pertaining to wastewater flow reduction analysis and program planning. With increasing numbers of communities becoming interested in the potential benefits of flow reduction, and with the introduction of flow reduction analysis requirements into the treatment facilities Planning (Step 1) phase of EPA's Construction Grants Program, a need was felt to provide guidance on flow reduction analysis procedures and on developing community programs. Each volume of this series thus works toward the ultimate objective of developing community flow reduction programs that are practical, cost effective and able to be implemented.

- Part I of the first volume, Flow Reduction: Methods, Analysis Procedures, Examples, provides background information on flow reduction, including its role in facilities planning, its relationship to other water and wastewater programs, and case examples of communities which have implemented programs. Part II of the same volume provides a step-by-step methodology to serve as a guide in carrying out the flow reduction analysis. Descriptions of various flow reduction measures are included along with an assessment of their cost effectiveness.

- Part III, the second volume, demonstrates the flow reduction methodology by applying it to two real world communities. These documented case studies not only clarify the procedure but highlight the nature of flow reduction's costs and benefits.

- This volume, Part IV, is a package of flow reduction public information material designed to supplement a community's flow reduction program. This package consists of general guidance in developing a public information program, examples of specific techniques communities have used, and original clip art as well as a mini-catalog of materials available from other communities that can be adapted for direct use in a community's program.

Through these three interrelated documents, it is hoped that community leaders and planners will find the practical rationale and overall guidance needed to consider and realize the potential of flow reduction in their particular settings.

TABLE OF CONTENTS

PREFACE i

LIST OF ILLUSTRATIONS iv

LIST OF TABLES v

ACKNOWLEDGMENTS vi

PART IV. FLOW REDUCTION: DEVELOPING A PUBLIC INFORMATION PROGRAM

Section A Why Implement a Community Flow Reduction Program? . . 1

Section B Informing and Educating the Public About Flow Reduction 2

Section C Public Information Techniques 5

1. Mailing/Distribution of Printed Material 5
2. News Media 7
3. Personal Contact 7
4. Miscellaneous Events, Activities, Displays 8
5. Selecting Techniques for a Community Program 8

Section D Key Elements of a Public Information Program 10

Section E Highlights of Three Communities' Flow Reduction Public Information Programs 17

1. Maricopa Association of Governments, Pheonix, Arizona . 17
2. Pima Association of Governments, Tucson, Arizona . . . 25
3. Howard County, Maryland 28
4. Observations on Apparent Effectiveness of Programs . . 31

Section F Materials to Assist in Developing Your Own Public Information Program 33

1. Overview of Materials Provided 33
2. Example of a "Least-Cost" Program Implmentation Strategy 34

REFERENCES AND BIBLIOGRAPHY 38

CONTENTS (Concluded)

Appendix A Reproductions of Clip Art for Use in a Community Flow Reduction Public Information Program A-1

Appendix B Assumptions and Calculations Used in Developing Fact/Work Sheets in Appendix A on Savings From Flow Reduction B-1

Appendix C Mini-Catalog of Flow Reduction/Water Conservation Materials C-1

LIST OF ILLUSTRATIONS

Figure 1 Potential Benefits From Reducing Wastewater Flows . . . 1

Figure 2 Reasons for Implementing a Flow Reduction Public Information Program 3

Figure 3 The Three Essential Components of Communication 5

Figure 4 Minimum Requirements of an Effective Public Information Program 10

Figure 5 Sample 30-Second Public Service Announcement for Radio Used in Maricopa Association of Governments' Program . 19

Figure 6 Sample 30-Second TV Public Service Announcement Used in Maricopa Association of Governments' Program 19

Figure 7 Contents of Second Program Brochure 21

Figure 8 Chart From Brochure Which Accompanies Slide Show Produced for PAG "SLOW THE FLOW" Program 26

Figure 9 Flyer Introducing Water Bill Modification to Howard County Water Users 30

LIST OF TABLES

Table I Techniques Available for Use in a Public Information Program 6

Table II Examples of Money and Skills Donated to Public Information Programs 9

Table III Suggested Audiences, Messages, and Communication Techniques for a Public Information Program 12

Table IV Novel Ideas Implemented in Public Information Programs 14

Table V Estimated Budget for Maricopa Association of Governments' Flow Reduction Public Information Program . . 23

Table VI Summary of Apparently Effective Flow Reduction Program Elements Used in Pima County, Arizona and Howard County, Maryland 32

Table VII Example of "Least-Cost" Program and Implementation Strategy 35

ACKNOWLEDGMENTS

Flow Reduction: Developing a Public Information Program was prepared under the direction of Myron Tiemens, Deputy Director of EPA's Facility Requirements Division, and Barbara Yeaman, Public Education Consultant to EPA. Both provided comments and guidance which greatly benefited this document.

Contractor on this project was INTASA, Inc. of Menlo Park, California. Nicolaos V. Arvanitidis, President of INTASA, supervised preparation of this document and performed coordination with EPA. Day-to-day project management was the responsibility of Bill Betchart; research and writing on the project was by Sandra Postel. Sally Davenport created the "Flow Down" theme and designed the clip art material for use by communities in their public information programs. Original art work for the "Flow Down" program was prepared by Phil Frank of Sausalito, California. Layout and production of original clip art was by Lynn Marsh of Palo Alto, California.

Finally, the INTASA team wishes to acknowledge all those both inside and outside of EPA who took the time to review and comment on draft versions of this document, and who contributed material for it.

FLOW REDUCTION: DEVELOPING A PUBLIC INFORMATION PROGRAM

A. Why Implement a Community Flow Reduction Program?

Wastewater flow reduction represents a new thrust in municipal wastewater management. Increasing numbers of communities are finding flow reduction an attractive addition to more conventional strategies for achieving cost-effective wastewater management. As its name implies, flow reduction focuses on reducing the quantity of wastewater flowing into a municipal wastewater treatment plant. This is accomplished by reducing water use, and thus flow reduction is closely tied to water conservation.

A successful flow reduction program implemented at the community level can yield potential benefits to individual residents and the community as a whole. Examples of these benefits are illustrated in Figure 1 and listed below it.

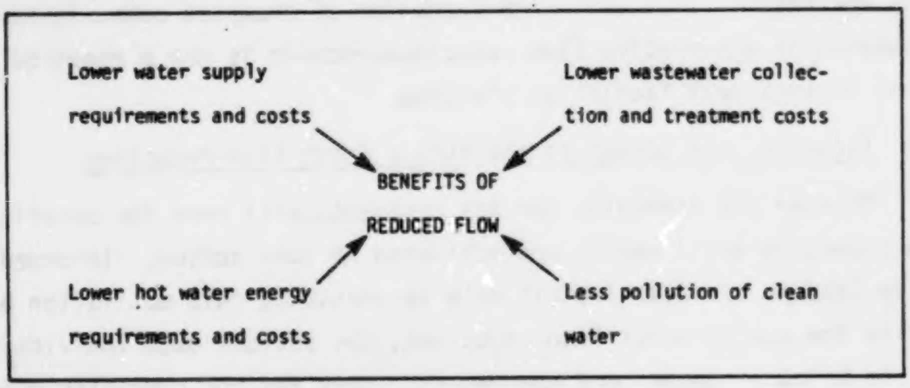

Lower water supply requirements and costs
Lower wastewater collection and treatment costs
BENEFITS OF REDUCED FLOW
Lower hot water energy requirements and costs
Less pollution of clean water

Figure 1 POTENTIAL BENEFITS FROM REDUCING WASTEWATER FLOWS

- Lower costs of collecting and treating the community's wastewater. Reduced flows may enable a community to postpone expansion of its existing treatment facilities or to construct and operate a facility smaller in size than would otherwise have been possible. Substantial savings may result both in capital and in operation and maintenance costs.

- Avoiding the adverse economic and environmental consequences of reaching or exceeding treatment capacity before additional facilities can be built.

- Dollar savings to individual residents, including substantial energy cost savings from less use of hot water. Energy to heat water can account for 15 to 25 percent or more of a household utility bill.

- Energy savings to the community from collecting, pumping and treating less water and wastewater.

- Environmental quality. Saving water that otherwise enters sewers prevents clean water from becoming polluted.

Spiraling costs of labor, materials and energy make these benefits increasingly difficult to ignore. Moreover, communities applying for Federal grants to help pay the cost of constructing new wastewater treatment facilities now are required by EPA to consider the potential benefits of flow reduction in their Step 1 facilities planning process. Federal funds through EPA's Construction Grants Program are in short supply. Flow reduction is one means of enabling a limited amount of available funds to go further toward meeting community and nationwide water quality goals and needs. Thus, with the exception of exempted communities, an evaluation of alternative flow reduction methods is now a required component of treatment facilities planning.

B. Informing and Educating the Public About Flow Reduction

Neither the community nor its residents will reap the benefits of flow reduction until people are motivated to take action. Informed community leaders can play a vital role in providing this motivation by informing the public about flow reduction, the actions each individual can take to bring it about, and the benefits they and the community can expect to receive as a result. Facts themselves often are sufficient motivation, but they must be communicated effectively to the public. Energy utility bills will not be reduced until householders know about hot water saving devices such as shower flow restricters and faucet aerators, and why and how to use them. Gallons of water will continue to be wasted until individuals are told about plumbing leaks and how to find and fix them, toilet dams and how to install them, water wasting habits and how to change them, and the dollars these simple actions can save. Specific reasons for implementing a flow reduction public information program are depicted in Figure 2 and include:

WHY IMPLEMENT A PUBLIC INFORMATION PROGRAM?

- Public understanding and support are essential to an overall flow reduction program.
- It responds to EPA's cost-effectiveness guidelines.
- It's a cost-effective means of reducing flows.
- It can improve utility/public relations.

Figure 2 REASONS FOR IMPLEMENTING A FLOW REDUCTION PUBLIC INFORMATION PROGRAM

- Public information is a vital component of any flow reduction endeavor. The success of any program depends upon the degree to which the public understands and supports the flow reduction measures taken.

- Consideration of a public information program presently is required of communities in Step 1 of EPA's Construction Grants Program. EPA's Cost Effectiveness Guidelines [Section 8 (c) (4)] state that along with performing a flow reduction analysis, a grantee shall, as a minimum: "Develop and provide for implementing a recommended flow reduction program. This shall include a public information program highlighting effective flow reduction measures, their costs, and the savings of water and costs for a typical household and for the community" (U.S. EPA, September 1978).

- An effective public information program can be one of the most cost-effective means of reducing wastewater flows. Measureable benefits can be achieved with minimal expenditures.

- As one public information specialist for a California utility pointed out, a well-run public information program can significantly improve utility relations with the public. In some cases, these public relations benefits may be as important as the actual water savings and reduced wastewater flows resulting from a program (Vossbrink, 1980).

The remainder of this volume is devoted to assisting those town managers, mayors, public works directors and concerned citizens who take the initiative to implement a community flow reduction public information program, recognizing what benefits a flow reduction program can provide for their community or simply desiring to carry out EPA's flow reduction requirements in a fruitful manner.

There are few models of such programs available from which to draw guidance. However, numerous water conservation programs that have been implemented provide valuable insight into the fundamentals of any public information program aimed at influencing public behavior. The intent in the following pages is not to develop a ready-made program but to provide incentives, ideas and overall guidance in developing a program to communicate the whats, whys and hows of flow reduction to the residents of a specific community. Toward this end, four sections and three Appendices follow:

- Section C contains a discussion and listing of available public information techniques. The purpose of this section is to help generate ideas as to what techniques may prove effective in particular community circumstances.
- Section D provides suggestions and guidance for developing a community program, including establishing effective combinations of targeted audiences, motivating messages and communication techniques.
- Section E describes the flow reduction public information programs implemented in three different communities. The purpose of these narratives is to provide a feel for various aspects of developing a program by relating how these communities perceived the need for a program, selected techniques, developed program strategies and handled the logistics of program implementation.
- Section F provides suggestions on how to use the material in the Appendices to implement a community program. A strategy for using these materials is described to show how the materials can fit together to create an effective package and to provide initial ideas for implementing an actual program.
- Appendices A, B, and C contain a package of original public information materials, necessary background information, and a mini-catalog of available existing materials, respectively. Together, these materials can assist a community in developing a relatively simple, low-budget program or a more elaborate one and thus are pertinent to any community's needs.

C. Public Information Techniques

Communication involves three essential components: an audience, a message, and a medium for conveying the message to the audience (Figure 3). Effective communication is achieved with the proper mix and interaction of elements comprising each of these three components. This section surveys communication methods suitable for a flow reduction public information program. These techniques fall into four basic categories:

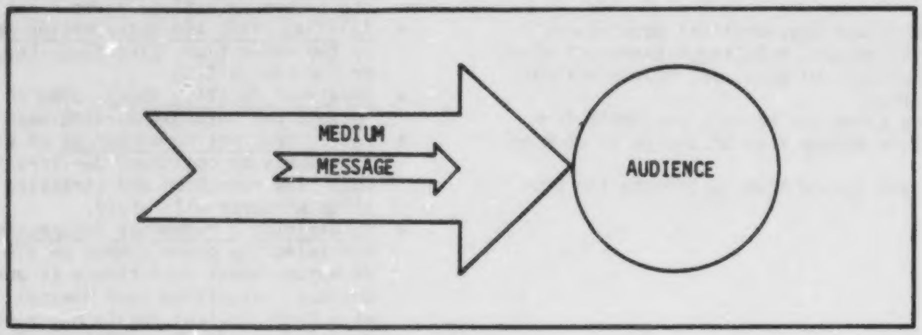


Figure 3 THE THREE ESSENTIAL COMPONENTS OF COMMUNICATION

- Mailing/distribution of printed material
- News media
- Personal contact
- Miscellaneous events, exhibits, displays.

Specific examples of techniques in each category are listed in Table I and discussed below.

1. Mailing/Distribution of Printed Material

Most public information programs will make use of direct mailings in order to ensure that a large majority of the relevant community members at least receive, if not read, information about the program. Material for mailing or mass distribution can be prepared and delivered for a wide range of costs depending upon how elaborate the material is (e.g., whether it requires professional preparation or is prepared by

Table I

TECHNIQUES AVAILABLE FOR USE IN A PUBLIC INFORMATION PROGRAM

Mailing/Distribution of Printed Material

- Water bill inserts sent to utility customers along with the regular water bill.
- Newsletters mailed separately from the water bill and usually more elaborate than bill inserts.
- Brochures either mailed to residences or made available at central locations such as banks and supermarkets.
- Fact sheets oriented toward either general water users or special groups, relating information about water-saving devices and measures, energy savings and dollar savings.
- Bumper stickers which can be made available from central locations either free of charge or at minimal cost.
- Posters displayed around town to promote the program.

News Media

- Radio or TV public service announcements, generally 30 or 60 seconds in length and broadcast between programs. Many radio and TV stations, especially in relatively small communities, will work free of charge with the city utility or program coordinator to help prepare public service announcements.
- Newspaper public service announcements.
- Press conferences. These are especially beneficial in the early stages of a program or to announce information that is relatively complex or of major importance. The program director or a utility representative informed about all aspects of the program can serve as the spokesperson. Visual aids such as charts and graphs are often useful in highlighting the main points at the conference.
- Press tours in which representatives from various media tour the wastewater treatment facilities. This serves the dual purpose of providing the media with a better understanding of the wastewater system and possibly generating relatively in-depth news stories which will educate the public.
- Press information kits consisting of written material containing facts about the community's wastewater situation and the flow reduction program. These can be prepared and distributed prior to a press conference or simply provided to the media as reference material for future news stories.
- Local radio and TV shows at times provide a useful forum for discussion of community issues, problems, and programs. An interesting and informative discussion between the talk show moderator and the utility or program representative can increase public understanding and acceptance of a flow reduction program and increase the program's credibility.
- Press coverage of program-related news items can greatly increase the public's awareness of the program. Making certain that the local media are informed, for example, of the mayor's planned tour of the treatment plant or the announcement of the winning poster in a "flow reduction poster contest" significantly adds to the program's visibility.

Personal Contact

- School presentations to educate youngsters about wastewater treatment and to encourage their participation in activities which support the flow reduction program. Programs can be adapted for students at various grade levels.
- Presentations to local youth groups such as scouting troops or ecology clubs.
- Talks at civic and conservation group meetings s as the Lions Club, Elks Club, League of Women Vot or the Sierra Club.
- Treatment facility tours, open to the public, giv perhaps one saturday morning each month.
- Public meetings or workshops on practical measure homeowners or apartment dwellers can take to promote flow reduction and stressing the dollar savi these measures will yield.
- Maintaining a telephone information service and a vertising the phone number people can call for information about such things as purchasing retrofi devices, installing such devices, or any problems with these devices people may encounter.
- Workshops or meetings with specialized groups who be impacted by the program or whose support can s ficantly increase the likelihood of program succe Personally interacting at the outset of a program members of the Homebuilders Association and owner local hardware and plumbing stores, for example, increase the likelihood that they will support an enhance the overall flow reduction program.

Miscellaneous Events, Activities, Displa

- "Roving" exhibits that can be displayed periodically at shopping malls, fairs and other central locations.
- Contests for the best flow reduction poster, sloga or logo.
- Use of local billboards to advertise the program.
- Developing curriculum materials for use in schoo dealing with local wastewater treatment condition emphasizing indoor water wasting habits, or givin mathematical problems that involve calculating water, energy, and dollar savings from various conservation measures.
- Tent cards for restaurant tables.
- Using available workbooks on water conservation t supplement school curricula.
- Developing slide shows to accompany talks and presentations.
- Encouraging the utility director, the mayor, and/or other influential community leaders to write a letter-to-the-editor for publication in the local newspaper explaining the flow reduction program and encouraging community support.

city or utility staff) and how it is distributed (e.g., whether it is sent along with a utility bill or mailed separately). Relatively simple material, like the bill stuffers included in the clip art package (Appendix A) can be produced for just a few cents per copy.

2. News Media

Local newspapers, radio stations, and television stations can be valuable resources to a community public information campaign. Effective use of the mass media allows many people to be reached through conveyance of a single message. Preparation of materials for broadcast may require professional expertise, however, and may at times be prohibitively expensive. Programs initiated in response to an existing or impending crisis situation can benefit significantly from the news media since these circumstances themselves are news items which will receive media attention.

The results of a survey conducted to measure public sentiment toward a conservation campaign implemented in Santa Clara County, California underscores the importance of working with all three major news media -- newspapers, radio stations and TV stations. Of those survey respondents indicating an awareness of the program, 38 percent indicated that their primary awareness was from newspapers, 11 percent from radio, 16 percent from television, and 9 percent from other means (e.g. group demonstrations) (PRx, 1981).

3. Personal Contact

Face-to-face communication with selected groups and individuals in the community can give the program a valuable personal touch, although it does require considerable time and energy from program or utility staff. Personal contact techniques allow for two-way communication, affording the public an opportunity to ask questions and air their concerns as well as providing the program coordinators with some useful feedback on public views. A utility or other implementing authority lacking the staff and time needed to make personal contacts should not discount these techniques too readily. Frequently, community members such as retired teachers, principals, or members of local civic or conservation groups will volunteer to speak throughout the community. They must be asked to do so however, and then be informed about the program and provided with adequate materials.

4. Miscellaneous Events, Activities, Displays

A host of miscellaneous techniques are available as indicated earlier in Table I; the individual applicability of each depends upon the local setting and circumstances. Applying some ingenuity to knowledge of the kinds of activities and projects that have been used can result in some very effective public information techniques.

5. Selecting Techniques for a Community Program

No single set of communication techniques will be best in every situation; the combination of techniques selected for a program should be suited to the particular circumstances of the community where it will be implemented. Several community characteristics are likely to be important:

- Nature of program goals. Depending upon whether the goals of the flow reduction program are immediate (e.g., crisis-related) or long term, certain techniques may be more effective and appropriate than others. For example, emphasizing the news media (e.g., press releases, press conferences, news stories) is likely to be valuable in a program with short-term goals for alleviating pending overloads of the wastewater treatment plant.
- Resources of the agency or authority implementing the program. In selecting communication techniques, trade-offs inevitably will be needed due to limitations in the resources of the implementing authority, including:
    - Funds. Many techniques require professional guidance and can quickly sap funds available to the program. For example, a decision to prepare TV or radio public service announcements, print elaborate brochures, or produce short films for news release, may require the elimination of some other techniques.
    - Skills. Speaking, writing, photography, and design skills are needed in order to employ some techniques. It is important to capitalize on skills available among those persons who are implementing the program.

  - Time. Selection of certain techniques will be inhibited because of the time demands they place on the implementing authority's staff. If understaffing is already a problem, sending an in-house speaker out to schools and club meetings several times each week may not be feasible.

- Availability of volunteered and donated time and skills. Obtaining voluntary assistance from community groups and individuals as well as donations of time and service from local professionals can help alleviate the resource limitations in developing a program. Voluntary help from local youth groups and service clubs can reduce substantially the amount of in-house staff time necessary to carry out the program. Using community volunteers and obtaining donated time and services provides the dual advantages of expanding the quantity of funds, skills, and time available, and of getting community members actively supporting and involved in the program. Table II gives some recent examples of money and services donated to public information programs.

- Characteristics of the audience or public. These include:
  - Degree of awareness about community water supply and wastewater issues and problems.
  - Likely degree of public acceptance and receptivity of a flow reduction program. For example, in communities where public resistance is expected, a program strongly emphasizing personal contact with key community groups may be essential.
  - Extent to which influential community groups or leaders support the program. Techniques can and should be chosen to capitalize on this support where it exists. Media coverage of a mayor expressing support for the program or of a local civic group sponsoring a program-related activity can help broaden the base of support throughout the community.

Table II

EXAMPLES OF MONEY AND SKILLS DONATED TO PUBLIC INFORMATION PROGRAMS

- The Phoenix, Arizona Maricopa Association of Governments' flow reduction program obtained about $280,000 worth of donated time and skills (Frank, November, 1980).
- The Oakland, California East Bay Municipal Utility District's water conservation program benefited from donations of air time by local radio and TV stations. Finding itself understaffed to carry out certain components of the program, the District utilized local Camp Fire Girls to distribute posters and to help organize a "water fair" complete with exhibits and skits.
- The Pinellas County Water Department of Clearwater, Florida sponsored an intensive, one-year water conservation public information program that received donated advertising and public relations assistance valued at around $250,000. The Department's expenditures for extensive media advertising, billboard displays, slide shows, and logo stamps amounted to only about $10,000 (Metcalf and Eddy, 1976).

D. Key Elements of a Public Information Program

No mayor, town manager, public works director or other community leader should allow lack of confidence in developing and implementing a public information program to prevent him or her from undertaking the effort. Even the most experienced public relations or advertising firm cannot produce effective campaigns every time -- much depends on subjective factors. The important advantage that a community leader brings to this endeavor is knowledge of and sensitivity to the local citizenry and the issues that concern them most. Armed with facts about flow reduction, basic communication tools, and some guidance on using these facts and tools, one can and should have confidence in approaching the task of developing a program. Again, the facts about flow reduction should motivate the public to respond, but they must be communicated effectively.

No public information program is recommended here as the best or the most likely to succeed in every case. However, based on experience drawn from past programs and the expertise of public information specialists, even the bare minimum program should have a strategy that incorporates three fundamental guidelines (Figure 4):

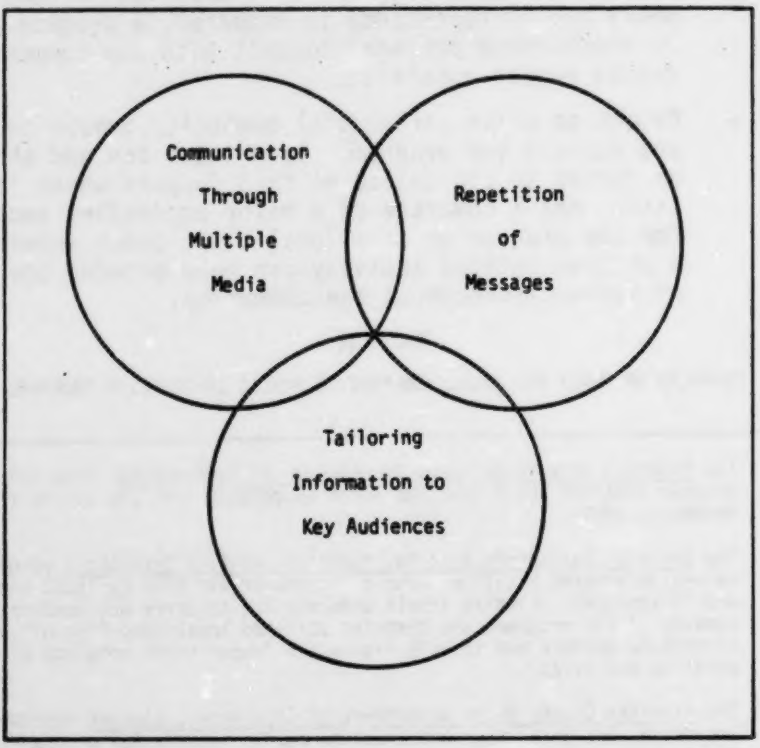

Communication Through Multiple Media
Repetition of Messages
Tailoring Information to Key Audiences

Figure 4 MINIMUM REQUIREMENTS OF AN EFFECTIVE PUBLIC INFORMATION PROGRAM

- Select techniques from several different categories of communication media (i.e., mailing/mass distribution of printed material, news media, personal contact, special events and exhibits). Only in this way will the program's messages reach most of the community.

- Repeat program messages. A "one-shot" program stands little chance of success.

- Tailor information to specific key audiences. This requires identifying the crucial audiences to be reached in the community and determining the factual message that will motivate each to respond.

Following these seemingly straightforward rules will not guarantee success, but will give the program a firm foundation upon which to build. The success of a program ultimately hinges upon the ability to communicate to targeted persons and groups a message that will motivate them to respond. The most effective audience/message/technique combinations will be different for different communities. Suggested audiences, motivating messages and techniques to consider in developing a program are shown in Table III.

Finding out what messages and program strategies are most likely to motivate water users in a particular community is a difficult but crucial task. In the Maricopa County, Arizona program, described in a subsequent section, the primary message to the public was that the area's wastewater treatment facilities would reach their capacity in six to eight months -- a message that in this instance did not motivate people to act. On the other hand, in Santa Clara County, California, where treatment facilities had reached capacity and overloads were polluting San Francisco Bay, residents appeared to respond to this message of treatment plant capacity problems. In Madera, California, a primary message to motivate residents to conserve was that water revenues were insufficient to pay the increasingly high cost of energy for pumping water, requiring $60,000 to be taken out of the city Treasury to pay the utility bill (Butterfield, 1981). For many programs, including the Pima County, Arizona program described in a later section, the substantial savings in water and energy costs that homeowners can realize through conservation/flow reduction measures has been an effective motivating message. This message of home owner cost savings is emerging as perhaps the strongest and most nearly universal motivation for people to support community flow reduction/conservation programs (Butterfield, 1981).

Table III

SUGGESTED AUDIENCES, MESSAGES, AND COMMUNICATION TECHNIQUES FOR A PUBLIC INFORMATION PROGRAM

Key Audience	Key Motivating Message(s)	Particularly Appropriate Techniques
Home owners/ apartment renters	• Flow reduction measures save water, energy, and dollars with minimal cost, little effort, and no inconvenience. • Flow reduction saves tax dollars by decreasing community expenditures for building and operating treatment facilities.	• Water bill inserts. • Media public service announcements. • Presentations. • Exhibits of devices and cost saving information. • Treatment facility tours.
Apartment owners	• Retrofitting rental units saves money at minimal cost and with no tenant dissatisfaction.	• Information flyers mailed to landlords.
Civic groups, public interest groups (e.g. Lions Club, Sierra Club, League of Women Voters)	• As concerned community leaders, they can ignite the program.	• Presentations at meetings to encourage active support and suggest activities they can do.
Homebuilders Association	• Water-saving features can enhance the attractiveness of homes to potential buyers. • The program represents an opportunity to enhance public visibility and improve their image.	• Workshops or meetings of member representatives. • Information flyers.
Hardware and plumbing supply store owners and managers	• Increased sales revenues can be obtained if they advertise, display and stock water-saving devices.	• Workshops or meetings. • Information flyers.
School children	• Saving water is fun. • Saving water is something they and the family can do at home.	• Puzzles about conservation. • Math problems showing water, energy savings. • Essay/poster contests. • Take-home class assignments on reading water, gas meters.
Scout troops and youth groups	• Flow reduction activities can be fun and help the community.	• Activities to earn a water-saving badge or certificate. • Presentations at club meetings. • Contests of exhibits for display at fairs or shopping centers.

While educating and informing the public about flow reduction and its benefits is the core of any program, relying only on the increased public awareness that this brings about to get people to take action is tenuous. Studies have shown that the link between educating people about environmental matters and influencing their behavior generally is weak (Baumann, 1981; Bell et al, 1978). A strategy is needed that not only informs people about what behavioral changes are in order but also actively prompts them to make those changes and reinforces those changes when they occur. Accomplishing this requires no additional communication techniques, but rather requires that techniques be implemented in a sequence, time frame and manner such that these prompting and reinforcing effects result. Prompts -- written, spoken, or visual messages that encourage a specific action -- are especially important when the program is getting underway. Billboard messages, posters, press conferences and exhibits are just a few techniques well suited for this task. Reinforcement involves influencing behavior through positive incentives (e.g. giving water credits for a level of monthly water use below a certain amount), negative incentives, or feedback.

Feedback, in particular, is essential if water users are to continue their efforts over an extended period of time. Showing water users that their conservation efforts are having a positive effect can help motivate them to continue their efforts; making them aware that they could be doing better can motivate them to try harder.

One technique several communities have used to provide feedback on an individual basis to water users is to highlight on the water bill how the quantity of water used that particular month compares with the previous month or with the same month of the previous year. Occasional press conferences also can provide feedback by informing the public of measurable reductions in wastewater flows to the treatment plant, or relating how many of the community's residents have installed retrofit devices. Sending speakers to local service club meetings provides another opportunity to give feedback on overall program performance.

Combining an awareness of available communication techniques, motivating messages and audiences to be reached with a small measure of ingenuity can result in an exciting and effective public information program. Table IV describes some ideas that communities around the nation have implemented.

Table IV

NOVEL IDEAS IMPLEMENTED IN PUBLIC INFORMATION PROGRAMS

CONVEY ORIGINAL IDEAS FROM CONSUMERS	The Marin Municipal Water District in Northern California distributed a brochure entitled "Water Saving Tips - From Our Consumers" containing suggestions received from its own customers on ways to save water, energy and money.
WATER CREDITS AND CASH REFUNDS	The Goleta County Water District in Goleta, California established a water conservation credit program whereby District customers using less than 700 cubic feet (5,236 gallons) of water per month averaged over the previous year qualified for a cash refund or water credit.
SPECIAL WATER AWARENESS WEEK	Westminster, Colorado's water conservation program has included an annual Water Awareness Week during which an intensive public information effort draws attention to the importance of water conservation. In preparation for this week during May 1980, the city encouraged school children to submit drawings, essays and poems on water conservation themes to be displayed in City Hall. Schools were also invited to schedule 30-45 minute tours of Westminister's water plant.
CLASSROOM WORKBOOKS	The East Bay Municipal Utility District in Oakland, California developed "The Official Captain Hydro Water Conservation Workbook." Many communities throughout the country have included the Workbook in their school curricula. Its wide-ranging use and acceptance attests to the effectiveness of this education technique.
DEMONSTRATION MODELS	A water conservation program in Virginia implemented through the Virginia Water Resources Research Center has included demonstration models showing how to fix leaks and how to retrofit showers, toilets, and faucets.
WORKSHOPS FOR SCHOOL TEACHERS	The Virginia program has also included workshops for school teachers to show them how to incorporate water use and conservation lessons into science curricula. The Virginia teachers have responded enthusiastically to these workshops and to the water conservation workbook developed for use in schools. About 15,000 copies of the workbook, which included take-home assignments, have also been distributed to 4-H clubs (Birch, 1980).

Table IV (Continued)

SPECIAL EXHIBITS--WATER USE COMPUTER QUIZ	Water conservation exhibits displayed at shopping centers, county fairs, 4-H clubs and garden clubs have been very well received by Virginia communities. Some of these exhibits include a computer quiz which estimates an individual's water use based on his or her answers to several questions and suggests ways of cutting back water use.
PRESENTATIONS TO HOUSING AUTHORITIES	As part of its water conservation public information effort, the Illinois Department of Commerce and Community Affairs made presentations to local housing authorities on the use of water conservation devices in new housing and structures undergoing renovation (Illinois Department of Commerce and Community Affairs, 1979).
CONTACTING PLUMBING SUPPLIERS	Also as part of the Illinois program, contacts were made with manufacturers, suppliers, and retailers to encourage promotion of their water saving devices. The message conveyed was that such promotion can bring them profits and provide a valuable community service.
TELL HOW TO READ METERS	A number of communities have enclosed simple flyers or inserts with water bills explaining how to read a water meter. Making people aware of their water use is an essential first step in achieving water savings; the consciousness-raising effect of this one technique enhances the effectiveness of all others.
USE WATER BILLS TO GIVE FEEDBACK	The Denver Water Department's water conservation efforts include a computer analysis which allows the utility to point out increases or decreases in water use on each customer's water bill. Periodic feedback on how users are doing in their own conservation efforts has been found to be an effective tool for reinforcing behavior or motivating users to take firmer action.
INVOLVE STUDENTS	The Denver program involved students in performing in-home water-wasting checks and provided them with rewards and incentives for implementing water conservation practices.

Table IV (Concluded)

RATING SYSTEM FOR WATER-USING APPLIANCES	Denver's program also included enlisting plumbing manufacturers, suppliers, and the construction industry in developing a water-use rating system. When attached to plumbing fixtures and appliances, these ratings make consumers aware of and allow them to compare the quantities of water used by various household appliances (Denver Water Department, 1979).
COOPERATION FROM LOCAL RESTAURANTS	Several public information programs, including those of the Goleta County Water District and the City of San Buenaventura in California, obtained the cooperation of local restaurants in serving water only to customers requesting it. Table tents (small card folded in half and placed on the table) were distributed for use in these restaurants. The cards told how much water and energy would be wasted by automatically serving ice water to every patron.

E. Highlights of Three Communities' Flow Reduction Public Information Programs

1. Maricopa Association of Governments, Phoenix, Arizona

Wastewater flows to Maricopa County, Arizona's largest wastewater treatment plant were only 600,000 gallons per day short of the plant's capacity in late 1978. Projections showed that the 115 million gallon per day plant, serving Phoenix, Tempe, Glendale and several other Arizona cities, could only accommodate an additional 6,000 persons and that its capacity would be exceeded in approximately four to eight months. Several smaller treatment plants in the county were also either at or near capacity. As viewed then, no additional capacity from facility expansions would be available until October 1981 at the earliest -- three years away.

In November 1978, the Maricopa Association of Governments (MAG), a voluntary association representing 19 cities and towns in Maricopa County and the Maricopa County Government, launched a full-scale flow reduction public information/education program in an attempt to alleviate the county's severe treatment capacity problem. The focus of the program was not to raise fears about an impending crisis but rather to educate the public about the county's wastewater treatment problems and how individuals could help to relieve them. The severity of the situation demanded that a program get underway quickly and remain active. One of MAG's first steps was to secure the services of a public relations firm to help shape an effective public information campaign.

An initial period of research and planning resulted in the selection of twelve distinct public information techniques to comprise the first phase of the flow reduction program. A flexible but well-ordered plan for implementing the selected program components was also developed in this planning stage. The elements comprising MAG's flow reduction public information program are briefly described below (Maricopa Association of Governments, 1979):

- Program themes. Three themes were created to establish an identity for the program and to lend continuity to all program components:

  - A cartoon-like character named "Shara Faucet."
  - A catchy name for the program -- "WOW," an acronym for "Watch Our Wastewater."
  - A program slogan -- "Help Slow the Flow! Watch Our Wastewater."

- First brochure entitled, "The Who, What, When, Where, Why and How of WOW". This easy-to-read, yet informative brochure briefly described the county's wastewater problem and the objectives of the WOW program. A total of 15,000 brochures were distributed, the majority going to city and town halls, the news media, hardware and plumbing stores, individuals on the MAG's 208 water quality mailing list, and members of the Central Arizona Home Builder's Association. They were later used for program presentations and distributed to local civic groups.

- Logo. The public relations firm designed a sheet of different size drawings of the "Shara Faucet" logo, called a "logo bug sheet." The purpose of the logo bug was to give continuity to all visual components of the program -- newspaper ads, brochures, billboards, and the like. During the spring of 1979, an average of 35 logo bugs per week appeared in the county's two largest newspapers.

- Press kit. An information package, consisting of a brochure, logo bug sheet, program fact sheet, and outline of an upcoming press conference, was prepared for distribution to city officials and media representatives who would attend the conference.

- Newspaper public service announcements. Over 60 newspaper articles were published during the initial seven months of the program covering a range of topics, including the county's wastewater problems, "Shara Faucet" tips of the week, and announcements of program activities.

- Radio and TV public service announcements. Seven television spots were produced, mostly from donated efforts. These spot announcements, communicating ways to reduce water use, were estimated to have been broadcast more than 350 times during the first seven months of the program. The technique of using radio public service announcements was judged to be one of the most effective measures in the program and was clearly the technique that reached the most people. Figure 5 describes one of the 30-second radio announcements used throughout the program. Figure 6 portrays a 30-second TV public service announcement used in the program (Maricopa Association of Governments, 1979).

CUT 1: 2229-A - "SHAR-A-FAUCET": 30

SOUND EFFECTS:	SHARA FAUCET VOICE OVER SOUND EFFECTS:
DRIPS OF LEAKY FAUCET	"A leaky faucet can waste hundreds of gallons of water - and our sewage plants are near capacity. This is Shara Faucet asking you to help, so don't
MAN HUMMING, WATER RUNNING...	let the faucet run while you're brushing your teeth - or shaving. Avoid unnecessary flushing
BATHROOM SOUNDS LITTLE KIDS SPLASHING & TALKING	and find out about water saving devices. Take a four-minute shower instead of a bath. Or 'Shar-a-Faucet' with a friend. Spread the "WOW" word...
ANIMATED DRIPS	Help slow the flow. Watch Our Wastewater!"

LOCAL LIVE TAG:	"WOW" is a public service campaign sponsored by the Maricopa Association of Governments to help slow the flow of wastewater in our Valley.

Figure 5 SAMPLE 30-SECOND PUBLIC SERVICE ANNOUNCEMENT FOR RADIO USED IN MARICOPA ASSOCIATION OF GOVERNMENTS' PROGRAM

VIDEO:	AUDIO:	
ESTABLISH SHOT OF BATHROOM SINK, SLOW ZOOM TO EXTREME CLOSE-UP OF LEAKY FAUCET	SOUND EFFECTS OF DRIPPING (INCREASES TO A GUSH BETWEEN FIRST SPOKEN WORD AND ... "DAY")	
	ANNOUNCER VOICE OVER SOUND EFFECTS:	A single leaky faucet can waste hundreds of gallons of precious water each day.
DISSOLVE TO ANNOUNCER STANDING IN FRONT OF WATER RUSHING INTO WATER TREATMENT PLANT		Water that ends up in our sewage treatment plants. But here in the Valley, these plants are operating near capacity. And it's going to take time to build new ones.
DISSOLVE TO ANNOUNCER IN FRONT OF OPEN AIR POOLS OF SEWAGE	DROP SOUND EFFECTS:	If we don't cut back on the wastewater we put into the system today, we'll be drowning in sewage problems tomorrow.
DISSOLVE TO SHOT OF WASHER SPINNING AGAINST DARK BACKDROP HAND LAYS WRENCH DOWN BESIDE WASHER		One little washer can do a big job.
CUT/DISSOLVE TO SHARA FAUCET TAG SUPERIMPOSED: "Watch Our Wastewater!" Sponsored by Maricopa Association of Governments.	TAG:	Help slow the flow. Watch Our Wastewater.

Figure 6 SAMPLE 30-SECOND TV PUBLIC SERVICE ANNOUNCEMENT USED IN MARICOPA ASSOCIATION OF GOVERNMENTS' PROGRAM

- "Shara Faucet" poster. A color poster, depicting the theme character along with a caption encouraging support of the program, was displayed in hardware and plumbing supply stores and markets. It was also used to enhance program presentations.

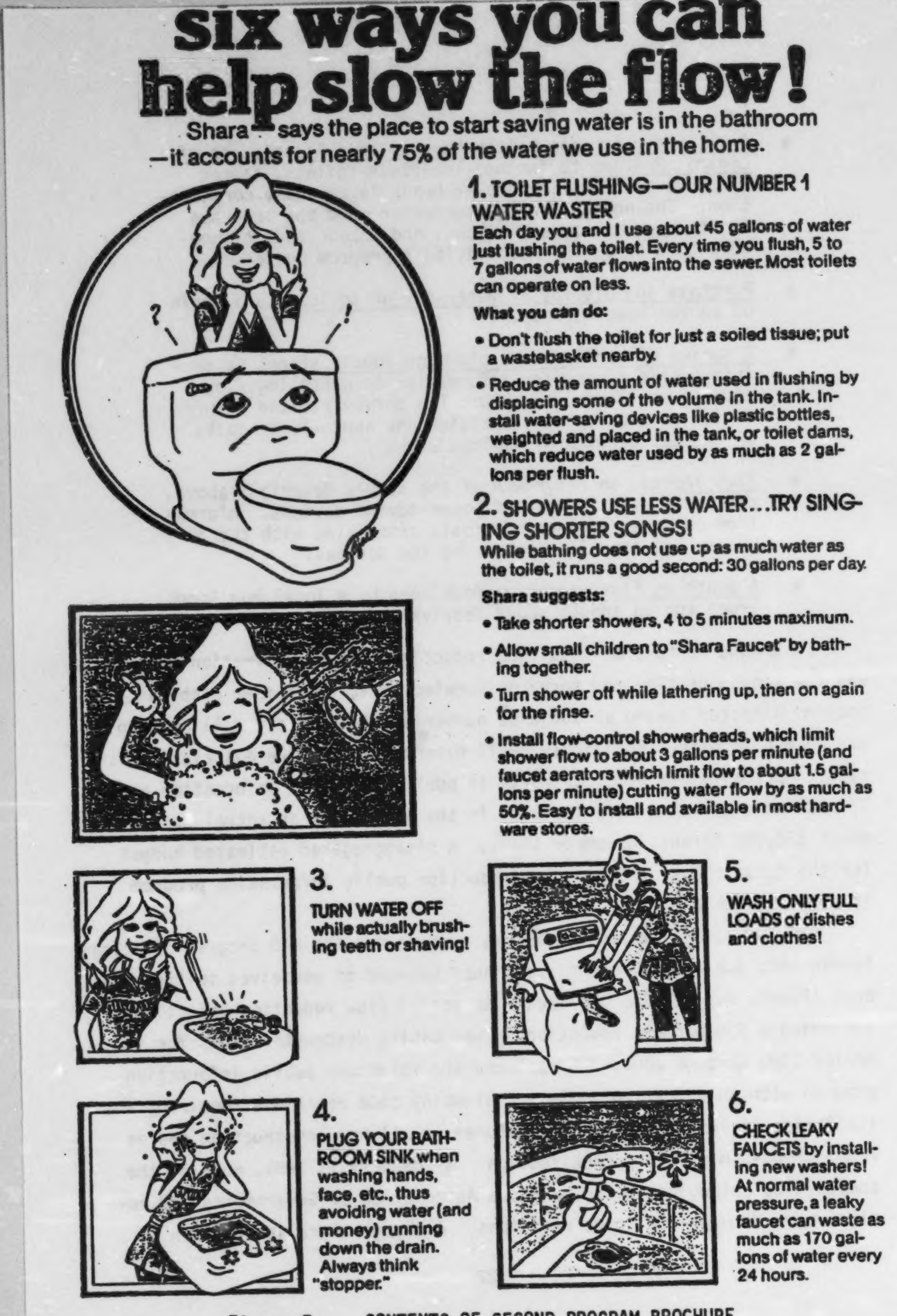
- Billboards. Over 50 full or partial billboards were donated to advertise the flow reduction program. Without the donations of a local advertising company and a home building company, the production and display costs of this communication medium would have made it infeasible.

- Second brochure: "The Hows of WOW." A second brochure, completed in mid-November 1978, described six ways to reduce water use, including better water-using habits, installing water-saving devices, and checking for leaks (Figure 7). This brochure was:
    - inserted with the water bill
    - distributed to hardware and plumbing supply stores, drug stores and markets
    - distributed by the Central Arizona Home Builders Association during customer walk-throughs
    - distributed at program presentations
    - distributed by some banks, mobile home parks and Boy Scout troops.

- Radio and TV news coverage and local shows. News coverage and segments on local radio and TV shows covered various topics related to the County's wastewater problems and the WOW program.

- Slide Show. An 11½-minute color-sound slide show was prepared primarily for use in program presentations to local clubs and organizations and in schools. A letter was sent to over 200 civic groups explaining the purpose and availability of the slide presentation. The response from these groups indicated it would likely be an important program technique. A total of 23 presentations were made in less than three months.

In addition to these planned techniques, the Association's flow reduction program was supplemented by several unplanned activities undertaken by supportive community groups and businesses. These activities added very little to overall program costs and included:



six ways you can help slow the flow!

Shara™ says the place to start saving water is in the bathroom —it accounts for nearly 75% of the water we use in the home.

1. TOILET FLUSHING—OUR NUMBER 1 WATER WASTER

Each day you and I use about 45 gallons of water just flushing the toilet. Every time you flush, 5 to 7 gallons of water flows into the sewer. Most toilets can operate on less.

What you can do:

- Don't flush the toilet for just a soiled tissue; put a wastebasket nearby.
- Reduce the amount of water used in flushing by displacing some of the volume in the tank. Install water-saving devices like plastic bottles, weighted and placed in the tank, or toilet dams, which reduce water used by as much as 2 gallons per flush.

2. SHOWERS USE LESS WATER...TRY SINGING SHORTER SONGS!

While bathing does not use up as much water as the toilet, it runs a good second: 30 gallons per day.

Shara suggests:

- Take shorter showers, 4 to 5 minutes maximum.
- Allow small children to "Shara Faucet" by bathing together.
- Turn shower off while lathering up, then on again for the rinse.
- Install flow-control showerheads, which limit shower flow to about 3 gallons per minute (and faucet aerators which limit flow to about 1.5 gallons per minute) cutting water flow by as much as 50%. Easy to install and available in most hardware stores.

3.

TURN WATER OFF while actually brushing teeth or shaving!

4.

PLUG YOUR BATHROOM SINK when washing hands, face, etc., thus avoiding water (and money) running down the drain. Always think "stopper."

5.

WASH ONLY FULL LOADS of dishes and clothes!

6.

CHECK LEAKY FAUCETS by installing new washers! At normal water pressure, a leaky faucet can waste as much as 170 gallons of water every 24 hours.

Figure 7 CONTENTS OF SECOND PROGRAM BROCHURE

- A voluntary program by the Homebuilders Association of Central Arizona to include low-flush toilets, faucet aerators and low-flow shower heads in new home construction. The Homebuilders Association used the logo bug in its new home advertisements and encouraged its members to display the Association's program poster.

- Purchase and display of water-saving devices by a chain of convenience markets.

- A survey of hardware and plumbing supply stores to satisfy public demand for information on where low-flow devices could be purchased. The survey yielded information on the types, quantities and approximate costs of devices carried by various stores.

- Fact sheets, an outgrowth of the survey described above, providing descriptions of water-saving devices, information on water savings and costs associated with the devices, and tips for installing the devices.

- A booth on flow reduction developed by a local Boy Scout troop for an annual scout festival.

A unique feature of this flow reduction public information program was the amount of time and services donated to it. A rather elaborate program directed toward an audience numbering close to one million people was developed with surprisingly small expenditures by the Association itself. Approximately $280,000 worth of public relations information and TV and radio air time were included in the program at an actual cost of about $30,000 (Frank, November 1980). A disaggregated estimated budget for the first phase of MAG's flow reduction public information program is shown in Table V.

In July 1980, two months before funding for the MAG program officially ran out, the program was discontinued because of perceived ineffectiveness (Frank, July 1981). To meets its stated flow reduction objectives, including a 9.5 percent reduction in per capita wastewater flows for the period 1980 through 2000, MAG replaced the voluntary public information program with an effort to implement plumbing code revisions requiring installation of low-flow plumbing fixtures in all new construction and as replacements in existing construction. By January 1, 1981, most of the communities belonging to the Maricopa Association of Governments had implemented the municipal code revisions. Although there is still an

Table V

ESTIMATED BUDGET FOR MARICOPA ASSOCIATION OF GOVERNMENTS' FLOW REDUCTION PUBLIC INFORMATION PROGRAM

Program Element	Production Cost ($)	Agency Cost ($40/hr)	Total Cost ($)
Research and planning	----	2000	2000
First brochure (quantity: 15,000)	1440	360	1800
Logo bug	390	80	470
Newspaper public service ads	300	240	540
Press kit	270	240	510
Program fact sheet	----	80	80
News release	----	120	120
Shopping center letter	35	80	115
News conference notification	35	80	115
Radio public service ads	500	240	740
News conference	----	320	320
TV public service spots	1800	200	2000
Poster (2 color)	800	240	1040
Bill stuffer (quantity: 250,000)	2380	160	2540
Billboard snipes	570	240	810
5-part TV series	----	320	320
Second brochure (quantity: 30,000)	1812	320	2132
Distribution of logo bug	15	160	175
Miscellaneous news releases	100	800	900
Miscellaneous supervision	----	680	680
Contingency time	----	2000	2000
Totals	$10,447	$8,960	$19,407

occasional radio, TV or newspaper spot advertisement for the program, no further voluntary public information efforts are planned at this time.

Why did what outwardly appears to be a well-organized, comprehensive public information program lead to abandonment because of perceived ineffectiveness? Though the answer is plagued with uncertainties, a MAG staff member close to the program offered three possible reasons (Frank, July 1981). First, there was no publically-perceived crisis situation -- no imminent health hazard or threat of sanctions -- to serve as a rallying point for public support. Radio and TV coverage began to decline when it became clear that what existed was a severe problem and not a crisis of the moment. MAG never intended to portray the problem as a crisis, but rather relied on an accurate portrayal of the problem to be sufficient motivation for support. Second, the content of the MAG public information material did not convey the message that home owners may realize substantial cost-savings from flow reduction measures; thus, no financial incentive was provided. Preliminary, cursory analyses had indicated to the MAG staff that these cost savings would not be substantial (though it was later concluded that a more detailed look at costs and savings to the home owner may have led to a different finding). Thus, water user cost savings was not emphasized in the program material. Finally, the MAG staff felt constrained by the available budget even with the substantial voluntary support from community groups and enterprises.

In all, one would have to conclude that the MAG program represented a valiant attempt to achieve cost-effective flow reduction through a public information/education campaign at a time when few communities had even considered flow reduction's possibilities. The program's apparent lack of success can be attributed most directly to the absence of a message that motivated the public to respond with support. In the absence of a community crisis, real or perceived, and without public perception of potential financial benefits, sufficient support never materialized. Insight about flow reduction programs has clearly been gained through MAG's efforts. Additional information about the program can be obtained by contacting Mark Frank, 208 Program Manager for MAG (address and phone number provided in Bibliography). Arrangements to borrow or purchase a copy of the MAG slide show and possibly other materials can also be made through Mr. Frank.

2. Pima Association of Governments, Tucson, Arizona

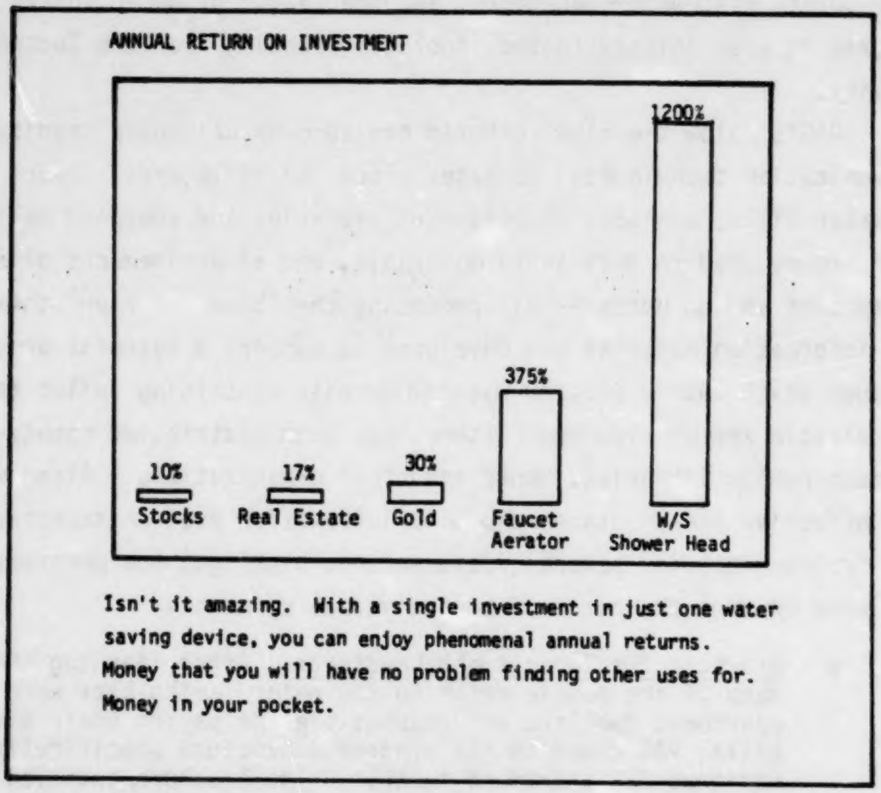
"Slow the Flow" is the central theme of the Pima Association of Governments' (PAG) flow reduction public information program. Introduced in September 1979, the "Slow the Flow" program focuses on reducing indoor water use. "Slow the Flow" has been implemented in tandem with another Tucson program called "Beat the Peak," introduced by the Tucson Water Department in June 1977 and oriented toward reducing peak summer water demand. "Slow the Flow" is promoted actively during September through May, while "Beat the Peak" is emphasized during the three summer months when outdoor water use is greatest.

"Slow the Flow" is sponsored jointly by PAG, the City of Tucson, Pima County Wastewater Management and the League of Women Voters. The program is also jointly funded, including funding from the Tucson Water Utility.

PAG's "Slow the Flow" program has successfully used traditional communication techniques: messages placed on billboards, flyers sent out in water bills, exhibits displayed at libraries and shopping malls, volunteer groups used to distribute materials, and advertisements placed in newspapers and on buses -- all promoting the "Slow the Flow" theme. Public information material was developed to support a retrofit program through which nearly 100,000 water saver kits containing toilet tank bags and plastic shower flow restrictors have been distributed county-wide through public libraries, banks and other organizations. Along with making effective use of standard public information program techniques, the PAG program includes several features that highlight how programs can be tailored to meet the needs of an individual community:

- Brochure for Tenants and Landlords. After learning that many of the people refusing the water saving kits were apartment dwellers not responsible for paying their water bills, PAG added to its program a brochure specifically designed for apartment tenants. The brochure, entitled "The Renters Guide to Easy Water Conservation," asks tenants to consider the question: "Why conserve water if your landlord foots the bill?" The brochure stresses the savings in energy costs that tenants can realize from the hot water saved by using flow reduction devices as well as the community and taxpayer benefits of reduced long-term wastewater treatment costs. Though specifically designed for tenants, the brochure contains information useful to landlords; numerous apartment and mobile home park managers have requested it. The PAG brochure has reached over 4,000 apartment owners and 20,000 renters.

- Slide Show on Retrofitting. A 10-minute slide-tape production focusing on the costs and benefits of retrofitting homes with various water saving devices has been shown to over 50 community groups. The slide show has been well received at group presentations and is considered one of the strongest elements of PAG's program (Dorsey, July 1981). A four-page brochure, containing the chart shown in Figure 8, is distributed to those viewing the slide show and helps to emphasize the message of home owner's cost savings.



Isn't it amazing. With a single investment in just one water saving device, you can enjoy phenomenal annual returns. Money that you will have no problem finding other uses for. Money in your pocket.

Figure 8 CHART FROM BROCHURE WHICH ACCOMPANIES SLIDE SHOW PRODUCED FOR PAG "SLOW THE FLOW" PROGRAM

- Appeal to Senior Citizens. The large, elderly retired population in the area was found to be a key audience for communication about water conservation. The significant proportion of their cost-of-living represented by the cost of water and energy coupled with their fixed incomes motivates these elderly residents (both permanent and long-term winter residents) to adopt water saving practices. An especially enthusiastic response to the slide show has come from senior citizens. The program's messages reach these people through PAG presentations to organizations of retired federal employees, church groups, and gatherings of retirement community residents.

- Use of Civic Groups and Schools. The local chapter of the League of Women Voters co-sponsors the "Slow the Flow" program. The league received an $8,000 EPA grant to fund teacher workshops on water conservation and flow reduction.

- Demonstration Model for Presentation. A working model of a toilet tank made of transparent acrylic is used in presentations to schools and community groups to demonstrate how to install toilet dams.

Current plans for the PAG flow reduction program include a more intensive effort to encourage apartment and mobile home owners to install water saving devices in their rental units, and to encourage more managers of plumbing and hardware supply stores to display and stock water saving fixtures in a visible location in their stores. Over 25 percent of these store managers have agreed to participate. Beginning in September or October of 1981, PAG will also be working with a small water company that serves several mobile home parks to conduct a test of public use and acceptance of more expensive water saving devices (compared to the devices contained in the water-saving kits). Plans also include continuing with the techniques that have been used during the program thus far.

Though no surveys were conducted to determine the extent to which the public has been motivated to take specific actions, the techniques used thus far have been judged relatively effective based on overall public response (Dorsey, July 1981). Presentations to community groups are generally followed by significant numbers of requests for more information. A local TV station has recently used information contained in "Slow the Flow" public information material in developing a documentary on the groundwater situation in the region and the need for conservation.

Carol Dorsey, the principal coordinator and person responsible for implementing the PAG "Slow the Flow" program, feels that the techniques used have proven to be an effective package. Billboard messages and signs on buses may not motivate individuals to take action but are needed to give credibility and visibility to the program. Water bill inserts and especially the slide show have provided strong motivation for public support. Finally, the strongest message communicated through the program has appeared to be the dollar savings -- particularly hot water energy cost savings -- to water users from implementing flow reduction measures (Dorsey, July 1981).

Persons desiring to learn more about the PAG program can contact Carol Dorsey of the Pima Association of Governments (address and phone number provided in Bibliography). Arrangements can also be made through Ms. Dorsey to purchase copies of the slides and script used in the slide show or other "Slow the Flow" program materials.

3. Howard County, Maryland

Howard County, Maryland began implementing its water conservation/ flow reduction program in March 1980 in an attempt to avoid unnecessary expansion of water and wastewater treatment facilities and in response to stipulations for obtaining funds through EPA's Construction Grants Program. Howard County has undergone relatively rapid residential development. To help offset the increased water demand and wastewater flows caused by residential growth and to help reduce water and sewer system expansion costs, a specific program goal of reducing per capita residential use by 15 percent (from 77 gpcd to 65 gpcd) was established.

Implemented through the Bureau of Environmental Services in the Department of Public Works, Howard County's program has included a strong public information component to support the County's efforts in retrofitting water-using fixtures in existing residences (including single family homes, townhouses, apartment complexes and condominiums). Specific elements of Howard County's ongoing flow reduction public information program include the following:

- Contacting Target Audiences. Residential associations, apartment complex owners and townhouse owners have been contacted through letters designed to stimulate their interest in the County's program. These letters conveyed the results of a retrofitting program involving 2,500 rental apartment units which indicated that savings of 20 to 25 percent in water and sewer costs and 10 to 12 percent in hot water energy costs could be expected from installation of faucet flow restrictors, shower head flow restrictors, and toilet dams, along with leak repair. Each letter briefly described what the retrofitting program included, how it would be carried out, and the telephone number of the appropriate person to contact about participating in the program.

- Reinforcing with Water Bills. Water bills were modified to help residential customers monitor their monthly water use and compare it to the county's conservation goal of 65 gallons per capita per day (gpcd). Each water bill provides the current and preceding month's average daily usage rate (total water use for the billing period divided by the number of days in the billing period).

  A flyer was distributed with the water bills when the comparative water use feature was added to draw the customers' attention to it and to encourage them to compare their actual water use with the program goal of 65 gpcd (Figure 9). The flyer encouraged those exceeding their goal to call the Bureau of Environmental Services to obtain free water saving devices and ideas on how to save additional water. A status report on the program subsequently prepared by the Bureau indicated that 200 phone calls had been received and that 80 of these calls resulted in a visit to the Bureau to obtain water saving devices (Irvin, June 1981).

- Other Reinforcing Techniques. A booklet entitled "The Worth of Water" was prepared which describes the Howard County water supply and water treatment systems. This booklet has been mailed to customers along with monthly water bills. A slide show based on the booklet was also developed.

- Targeting to the Student Audience. An emphasis on in-school education has included three specific elements (Irvin, June 1981):

  - Placing two water conservation films in the county's Department of Education Media Center and making the films available to environmental education classes.

  - Including water conservation curriculum materials in the environmental education coursework carried out in schools. It is expected that a revised version of the Captain Hydro series (see Appendix C), developed for the East Bay Municipal Utility District of Oakland, California, will be purchased for use in classrooms. Consideration also has been given to use of the "Water and Man" activity guides and lesson plans developed by Water and Man, Inc. of Salt Lake City, Utah.

- Distributing water conservation kits to schools when requested from the Bureau. At the time of this writing, approximately 2,500 kits had been distributed.

Something new has been added to your water bill. It's a new way to measure your water consumption.

Beginning with this bill, your average daily water use (the total number of gallons you used during the billing period) will be displayed. For comparison purposes, your average daily water use for the last billing period will also be displayed.

In addition, we have established a Water Conservation Goal - the number of gallons per day (65) for each of your household members which represents efficient water use. The table below will help you to determine the goal for your entire family.

Compare your actual water use -- this bill and last bill -- with your goal. If you're using more water than your goal, call the Bureau of Environmental Services, at 992-2388, for free water savers and common sense ideas to help prevent water waste.

NUMBER OF HOUSEHOLD MEMBERS	CONSERVATION GOAL GALLONS PER DAY
1	65
2	130
3	195
4	260
5	325
6	390
7	455
8	520

Figure 9 FLYER INTRODUCING WATER BILL MODIFICATION TO HOWARD COUNTY WATER USERS

- Use of Newspaper Publicity. Program publicity included press coverage by several newspapers including the Howard County Bureau of the Baltimore Sun and an Associated Press article in the Washington Post. These articles explain the rationale and goals of the program and the specific elements that comprise it. They also have served to personalize the program by highlighting the dynamic personality and enthusiasm of the program's manager, Albert Frank.

Costs to date of implementing the device installation and accompanying public information/education program have included three to six months of one staff person's salary for program planning and approximately $32,000 for production and purchasing of materials (Frank, September 1981). Program coordinator Al Frank estimates that 15 percent of the county's goal of a 15 percent reduction in per capita residential water use has been achieved. An estimated water savings of 150,000 gallons per day resulted from the device installation/public information program in the first year. Public reaction to the program has been positive and plans are to keep the program ongoing (Frank, September 1981).

A key feature of Howard County's program has been the targeting of specific residential groups and associations as prime candidates for participating in the program. Through personal contact and an effective motivating message, the Howard County program has gained the support of key community groups and individuals. Additional information about Howard County's program can be obtained by contacting Albert Frank, Program Manager for Water Conservation with the Howard County Bureau of Environmental Services (address and phone number provided in Bibliography).

4. Observations on Apparent Effectiveness of Programs

The foregoing narratives on flow reduction programs in Pima County and Howard County provide empirical evidence about potentially-receptive audiences, messages appropriate for those audiences, and media for communicating these messages. Observations on the apparent effectiveness of the programs in Pima and Howard Counties are summarized in Table VI. The experience of the Maricopa Association of Governments is excluded from this summary because of the program's apparent lack of success, as perceived by the Program Manager.

Table VI

SUMMARY OF APPARENTLY EFFECTIVE FLOW REDUCTION PROGRAM ELEMENTS USED IN PIMA COUNTY, ARIZONA AND HOWARD COUNTY, MARYLAND

Audience	Message	Media
Tenants, Landlords and Residential Associations	Savings in energy costs to tenants by using flow reduction devices to reduce hot water use. Community and tax payer benefits of reducing long-term wastewater treatment costs.	Brochure distributed to tenants, apartment owners, mobile home park managers.
	Retrofitting can save 20-25 percent in water and sewer costs and 10-12 percent in hot water energy costs.	Letter conveying results of retrofitting 2,500 rental units with water saving devices.
Homeowners, Fixed Income Groups and Civic Groups	Retrofitting with water-saving devices saves money and provides a substantial annual return on investment.	Slide show on costs and benefits of retrofitting with accompanying brochure.
Residential Customers	Compare monthly water use to community's conservation goal of 65 gpcd.	Modified water bills showing current and preceding average monthly water use, with accompanying explanatory flyer.
	Understand the worth of water in terms of local water supply and wastewater treatment systems.	Booklet accompanying water bills and slide presentation.
Students	Install toilet dams to reduce wastewater flow.	Working model of toilet tank for use in presentations.
	Understand the benefits of water conservation.	Water conservation films and curriculum materials.
	Implement water conservation at home.	Water conservation kits distributed in schools.
Public-At-Large	Articles explaining the rationale, goals and program elements of a community's flow reduction program.	Newspapers.
	Become aware of community's flow reduction program and goals.	Billboards and signs in buses.

F. Materials to Assist in Developing Your Own Public Information Program

1. Overview of Materials Provided

Materials included in Appendices A, B, and C are intended to provide the basic elements for designing a relatively simple or more elaborate community-specific flow reduction program. You are the best judge of what may be effective in your community. Thus, the materials are organized so as to provide flexibility in deciding what to include in your program and how specific to the community you want the public information to be. The material is organized as follows:

- Appendix A: "FLOW DOWN Program" Clip Art. The envelope at the back of this booklet contains a set of original, reproducable clip art suitable for implementing a "least-cost" flow reduction program built around a FLOW DOWN theme. Clip art is provided for a poster, a bumper sticker, print media advertisements (e.g., newspapers, newsletters), triple-fold "how-to" brochures, and fact/work sheets. Appendix A contains copies of this art with accompanying instructions and possible uses. All material in Appendix A emphasizes positive financial and environmental incentives to motivate and reinforce water-saving/flow reducing actions. In all, 18 pieces of original clip art are provided. Each can be personalized by adding the name and address of the entity sponsoring the program (utility, agency, and the like).

- Appendix B: Assumptions and Calculations. This provides information (e.g., water and energy rates) on assumptions and calculations used to develop the fact/work sheet clip art in Appendix A (e.g., energy and cost savings from fixing a leaky faucet). It can be used to modify the clip art to more accurately reflect community conditions, or to develop additional material.

- Appendix C: Mini-Catalog of Available Flow Reduction/Water Saving Materials. This provides examples of materials available from sources around the country and information on cost and ordering. Although much of the material was developed for water conservation programs (which focus on indoor and outdoor water use), these materials can be equally effective in flow reduction programs (which focus primarily on indoor water use). Material in Appendix C can be used to augment the FLOW DOWN clip art (e.g., with material designed for elementary school students) or to develop a different program.

In addition to the material and information in the Appendices, a detailed bibliography and list of references is provided for those desiring further information.

2. Example of a "Least-Cost" Program Implementation Strategy

The clip art in Appendix A is intended to provide communities with the basic elements of a public information program while sparing them the drain on limited in-house staff resources, or the expense of engaging the services of a professional advertising agency, layout and graphic design artist, or technical concept development professional. As such it represents a "least-cost" program. Costs also can be kept reasonable by enlisting the services and talents of various civic and youth groups in your community, individual volunteers and business donors, as shown through the experiences of other community flow reduction/water conservation programs.

The clip art in Appendix A should assist in motivating the citizens in your community to participate in a flow reduction program, and to take positive actions with an eye toward saving money in water and energy use as well as flowing down the amount of water entering community sewers, including both clean water and wastewater. An example of how to use this clip art in implementing your program is provided in Table VII, which identifies target audiences, messages communicated, and possible communication or distribution media for each item in Appendix A. The clip art itself is characterized as follows:

- Focus on Big Water and/or Energy Users. Some of the main indoor household water and/or hot water energy users are showers, toilets, faucets, and leaks. The clip art focuses on these uses.
- Emphasize Practical and Low-Cost Flow Reduction Measures. Relatively low cost flow reduction/water saving measures are featured for each use.
- Emphasize Monetary Savings. Each household can save money in water use and/or hot water energy use by adopting the measures promoted in the clip art.
- Emphasize Environmental Benefit. In addition to saving money, individuals and households can reduce the amount of clean water flowing into sewers, the amount of

Table VII

EXAMPLE OF "LEAST-COST" PROGRAM AND IMPLEMENTATION STRATEGY

Audience(s)	Message(s)	Clip Art From Appendix A	Possible Communication/ Distribution Media
• Public-At-Large	Turn Drops Into Dollars: Flow Down	Poster	• Plumbing & Hardware Stores • Schools & Libraries • Community Office Buildings • Displays (of water saving devices). • Chamber of Commerce • Bus Stations
	FLOW DOWN	Bumper Sticker	• Volunteer Groups (e.g., Scout Troups, 4-H Clubs) Door-to-Door Distribution. • Community and/or Utility Office Buildings (Available for Pickup).
	Turn Drops into Dollars: Support the "FLOW DOWN" Program. Flow down household sewage. Reduce community costs for sewage treatment. Contribute to a cleaner environment.	Print Media "Teaser" Ad (Watch this space...)	• Community Newspaper • Utility Newsletter • Church Newsletter • School Newspaper • 4-H Club Newsletter • Civic Groups Newsletters
	Availability of "FLOW DOWN": Guides for (1) Reading Water Meter, (2) Fixing Leaky Faucet, (3) Inserting Flow Restrictor	Three (3) Print Media Advertisements.	• Possible communication media as above.
	A simple specific action can reduce the amount of clean water flowing into the sewers and save dollars as well as energy in some cases. (1) "Find and Repair Leaks" (faucets). (2)"Reduce Shower Water Use." (3)"Insert Toilet Dams." (4)"Find and Repair Leaks" (toilets).	Four (4) Print Media Advertisements.	• As above.
• Junior High or High School Students	You can save money in water and energy costs for your household, and flow down the amount of clean water entering community sewers.	Fact/Work Sheets (as described above).	• Environmental Education Classes.
• Scout Troops		"How-To" Triple Folds (as described above).	• Special Projects.
• 4-H Clubs			• Displays at County Fairs, and the like.

Table VII (Continued)

Audience(s)	Message(s)	Clip Art From Appendix A	Possible Communication/ Distribution Media
• Fixed Income Groups • Tenants and Landlords • Homeowners • Mobile Home Parks	You can check your plumbing system for leaks by learning how to read your water meter.	"How-To" Triple Fold on Reading Water Meters.	• Handout at Group Meeting • Mail with Utility Bills • Volunteer Groups, Door-to-Door Distribution. • Community and/or Utility Offices, Libraries, and the like (Available for Pickup)
	You can fix leaky faucets and save water.	"How-To" Triple Fold on Fixing Leaky Faucets.	• Possible distribution/communication media as above, and consider also: • Hardware and Plumbing Stores.
	You can insert a flow restrictor in your shower and save dollars and energy.	"How-To" Triple Fold on Inserting Flow Restrictors.	• As above.
	Finding and repairing leaky faucets can save money in water and energy costs, and flow down the amount of clean water in sewers.	Fact/Work Sheet on Leaky Faucets, and Formulas for Calculating Household Costs and Savings from Repairing Leaks.	• As above.
	Finding and repairing toilet leaks can save money in water use, and flow down the amount of clean water going into sewers.	Fact/Work Sheet on Toilet Water Use, and Formulas for Calculating Household Costs and Savings from Repairing Leaks.	• As above.
• In addition to the above audiences, consider: Homebuilder's Associations	Inserting flow restrictors in showers can save money in water and energy costs, and flow down the amount of household sewage.	Fact/Work Sheet on Shower Water Use, and Formulas for Calculating Household Costs and Savings from Inserting Flow Restrictors.	• As above.
• Similar to the preceding, consider also Homebuilder's Associations	Installing faucet aerators or spray taps, or flow restrictors or controllers, can save money in water and energy costs, and flow down the amount of household sewage.	Fact/Work Sheet on Faucet Water Use, and Formulas for Calculating Household Costs and Savings from Installing Water-Reducing Devices.	• As above.
• As above	Reducing toilet water use by installing simple devices or shallow trap toilets can save money in water costs, and flow down the amount of wastewater entering the sewer.	Fact/Work Sheet on Toilet Water Use, and Formulas for Calculating Household Costs and Savings from Installing Water-Reducing Devices or Shallow Trap Toilets.	• As above.

wastewater in community sewers, and the amount of wastewater flowing to treatment facilities.

- Provide Central Theme. A central theme -- FLOW DOWN -- is provided as a unifying device for a flow reduction program.

More specific instructions for reproducing the clip art, and suggestions for using it, are provided in Appendix A.

REFERENCES AND BIBLIOGRAPHY

Baumann, Duane D. April, 1981. "Information Programs and Consumer Adoption of Water Conservation." Abstract of paper presented at the 1981 National Water Conservation Conference, Denver, Colorado.

Bell, Paul A., Jeffrey D. Fisher, and Ross J. Loomis. 1978. Environmental Psychology. Reprint of Chapter Ten: "Changing Behavior to Save the Environment." W.B. Saunders Company. Philadelphia, Pennsylvania.

Birch, Sandra. December 1980. Personal Communication. Virginia Water Resources Research Center. Blacksburg, Virginia.

Butterfield, Suzanne. July 1981. Personal Communication. Chief of the Office of Water Conservation, Department of Water Resources. Sacramento, California.

California Department of Water Resources. January 1976. Proceedings: An Urban Water Conservation Conference. Los Angeles, California.

California Department of Water Resources. May 1976. Water Conservation in California. Bulletin No. 198. Sacramento, California.

California Governor's Office of Emergency Services. May 1977. Community Water Management for the Drought and Beyond: A Handbook for Local Government. Sacramento, California.

California Department of Water Resources. 1978. A Pilot Water Conservation Program. Bulletin No. 191. (Including Appendices A-F). Sacramento, California.

Consumer Reports. October 1978. Volume 43, No. 10.

Denver Water Department. June 1979. Executive Summary of Denver Water Department Institutionalized Water Conservation Program. Denver, Colorado.

Dorsey[1], Carol. July 1981. Personal Communication. Pima Association of Governments. Tucson, Arizona.

Flack, Ernest J., Wade P. Weakley, and Duane W. Hill. 1977. Achieving Urban Water Conservation: A Handbook. Colorado Water Resources Research Institute, Colorado State University. Fort Collins, Colorado.

Frank[2], Albert. September 1981. Personal Communication. Program Manager for Water Conservation. Howard County Bureau of Environmental Services. Ellicott City, Maryland.

References (Continued)

Frank[3], Mark. November 1980 and July 1981. Personal Communication. Maricopa Association of Governments. Phoenix, Arizona.

Illinois Department of Commerce and Community Affairs. November 1979. Illinois Water Conservation Program.

Irvin, James M. June 1981. Chief, Bureau of Environmental Services, Department of Public Works of Howard County. Internal memo regarding status of water conservation program. Ellicott City, Maryland.

Lattie, James. 1977. "Public Education for Water Conservation." in Community Water Management for the Drought and Beyond. California Governor's Office of Emergency Services. Sacramento, California.

Maricopa Association of Governments. July 1979. "MAG 208 Flow Reduction Program Progress Report." Phoenix, Arizona.

Maricopa Association of Governments 208 Staff. July 1980. Assessment of Plumbing Code Revisions in Achieving Wastewater Flow Reduction. Maricopa Association of Governments. Phoenix, Arizona.

McGhee, Ronnie, Mary Reardon and Arleen Shulman, eds. 1978. Readings in Water Conservation. National Association of Counties Research, Inc.

Metcalf & Eddy, Inc. 1976. Water Savings. Prepared for the Santa Clara Valley Water District. San Jose, California.

Muller, John G. 1975. "The Potential for Energy Savings Through Reductions in Hot Water Consumption." in Proceedings -- Conference on Water Conservation and Sewage Flow Reduction With Water-Saving Devices. Pennsylvania State University. July 1975.

Nelson, John Olaf. March 1977. North Marin's Little Compendium of Water Saving Ideas. North Marin County Water District. Novato, California.

Nelson, John O. No date. "Flow Reduction by Sensible Water Conservation." North Marin County Water District. Novato, California.

Pennsylvania State University. July 1975. Proceedings - Conference on Water Conservation and Sewage Flow Reduction with Water-Saving Devices. University Park, Pennsylvania.

PRx. 1981. Santa Clara County Water Conservation Campaign, Program No. 1 -- Final Report. Prepared for California DWR, Santa Clara Valley Water District, and City of San Jose. Cupertino, California.

References (Continued)

U.S. Army Corps of Engineers, Institute for Water Resources. April 1979. An Annotated Bibliography on Water Conservation. Prepared by Planning and Management Consultants, Ltd. Contract No. DACW72-78-M-0742. Fort Belvoir, Virginia.

U.S. Department of Energy. 1980. The Low Cost/No Cost Energy Conservation Program in New England: An Evaluation. Prepared by Booz, Allen & Hamilton for U.S. DOE, Market Development Branch. Contract No. AM01-80CS21366. Washington, D.C. (Program included distribution of plastic shower flow restrictors.)

U.S. EPA. September 27, 1978. "Municipal Wastewater Treatment Works Construction Grants Program" (40 CFR, Part 35, Subpart E). Federal Register. Washington, D.C.

U.S. EPA. January, 1979. Municipal Wastewater Management - Citizens Guide to Facility Planning. Prepared by the Conservation Foundation for the Office of Water Program Operations. Washington, D.C. Clem L. Rastatter, ed.

U.S. EPA. January 1979. Municipal Wastewater Management - Public Involvement Activities Guide. Prepared by the Conservation Foundation for the Office of Water Program Operations. Washington, D.C. Clem L. Rastatter, ed.

U.S. EPA. February 16, 1979. "State and Local Assistance, Grants for Construction of Treatment Works" (40 CFR, Part 35, Subpart E). Federal Register. (Regulations on Public Participation in the Municipal Wastewater Treatment Works Construction Grants Program Carried Out Under the Clean Water Act). Washington, D.C.

U.S. EPA. 1979. Proceedings: National Conference on Water Conservation & Municipal Wastewater Flow Reduction. Held in Chicago, Illinois. November 1978. Prepared by Enviro Control, Inc. for EPA Office of Water Program Operations. Contract No. 68-03-2674. Washington, D.C.

U.S. EPA. March 1980. Residential Water Conservation: An Annotated Bibliography. Prepared for the U.S. Department of Housing and Urban Development by Pabon, Sims, Smith and Associates, Inc. Washington, D.C.

U.S. EPA. March 1981. Flow Reduction: Methods, Analysis Procedures, Examples. Prepared by INTASA, Inc., Menlo Park, CA, for EPA Office of Water Program Operations, Facility Requirements Division. Washington, D.C.

Vossbrink, David J. November 1980. Personal Communication. Sr. Public Information Representative, East Bay Municipal Utility District. Oakland, California.

References (Concluded)

Washington Suburban Sanitary Commission. February 1973. Final and Comprehensive Report: Cabin John Drainage Basin Water-Saving Customer Education and Appliance Test Program. Hyattsville, Maryland.

Washington Suburban Sanitary Commission (WSSC). November 1974. Final and Comprehensive Report - Washington Suburban Sanitary Commission's Water Conservation/Wastewater Reduction/Customer Education and Behavioral Change Program. Hyattsville, Maryland.

---

1. For more information about the PAG flow reduction program, contact:

   Ms. Carol Dorsey
   Pima Association of Governments
   405 Transamerica Building
   Tucson, Arizona 85701
   (602) 792-1093

2. For more information about the Howard County conservation program, contact:

   Mr. Albert Frank
   Howard County Bureau of Environmental Services
   3430 Court House Drive
   Ellicott City, Maryland 21043
   (301) 992-2388

3. For more information about the MAG flow reduction program, contact:

   Mr. Mark Frank
   Maricopa Association of Governments
   Water Quality Management Program
   111 South Third Avenue, Rm 300
   Phoenix, Arizona 85003
   (602) 262-8528

Appendix A

REPRODUCTIONS OF CLIP ART FOR USE IN A COMMUNITY FLOW REDUCTION PUBLIC INFORMATION PROGRAM

This appendix presents reproductions of camera-ready art work, which is contained in an envelope at the back of this document. Each piece is numbered separately, and sufficient art work is provided to product 18 pieces of public information material. Because some of the material is intended to be printed on two sides, there are 26 pieces of clip art provided in all.

The reproductions of the clip art are presented on the left-hand side of this appendix, and size information and suggested uses are listed on the right-hand, facing, page. Your printer can provide you with more specific information such as costs associated with various printing processes (e.g., offset or xerographic), different kinds of paper stock (e.g., 20-weight standard white bond or colored stock), and the like.

Reproductions of clip art for the following pieces of public information material are provided:

- Theme Poster: "FLOW DOWN! Turn Drops Into Dollars...". (Clip Art Piece No. 1).
- Theme Bumper Sticker: "FLOW DOWN" (Clip Art Piece No. 2).
- Teaser Advertisement for Program: "Turn Drops Into Dollars -- Support the FLOW DOWN Program" (Clip Art Piece No. 3).
- Three Advertisements for How-To Series: "FLOW DOWN Guide to Fixing Leaky Faucets" (Clip Art Piece No. 4); "FLOW DOWN Guide to Inserting Flow Restrictors" (Clip Art Piece No. 5); and "FLOW DOWN Guide for Reading Your Water Meter" (Clip Art Piece No. 6).
- Three Triple-Fold How-To Brochures: "FLOW DOWN Guide to Fixing Leaky Faucets" (Clip Art Pieces No's. 7 and 8 for two-sided printing; "FLOW DOWN Guide to Inserting Shower Flow Restrictors" (Clip Art Pieces No's. 9 and 10 for two-sided printing); and, "FLOW DOWN Guide for Reading Your Water Meter" (Clip Art Pieces No's. 11 and 12 for two-sided printing).

- Four Advertisements to Motivate Reducing Water Use and Flowing Down Amount of Household Sewage: "FLOW DOWN: Reduce Shower Water Use" (Clip Art Piece No. 13); "FLOW DOWN: Find and Repair Leaks" (Clip Art Piece No. 15); and, FLOW DOWN: Insert Toilet Dams" (Clip Art Piece No. 16).

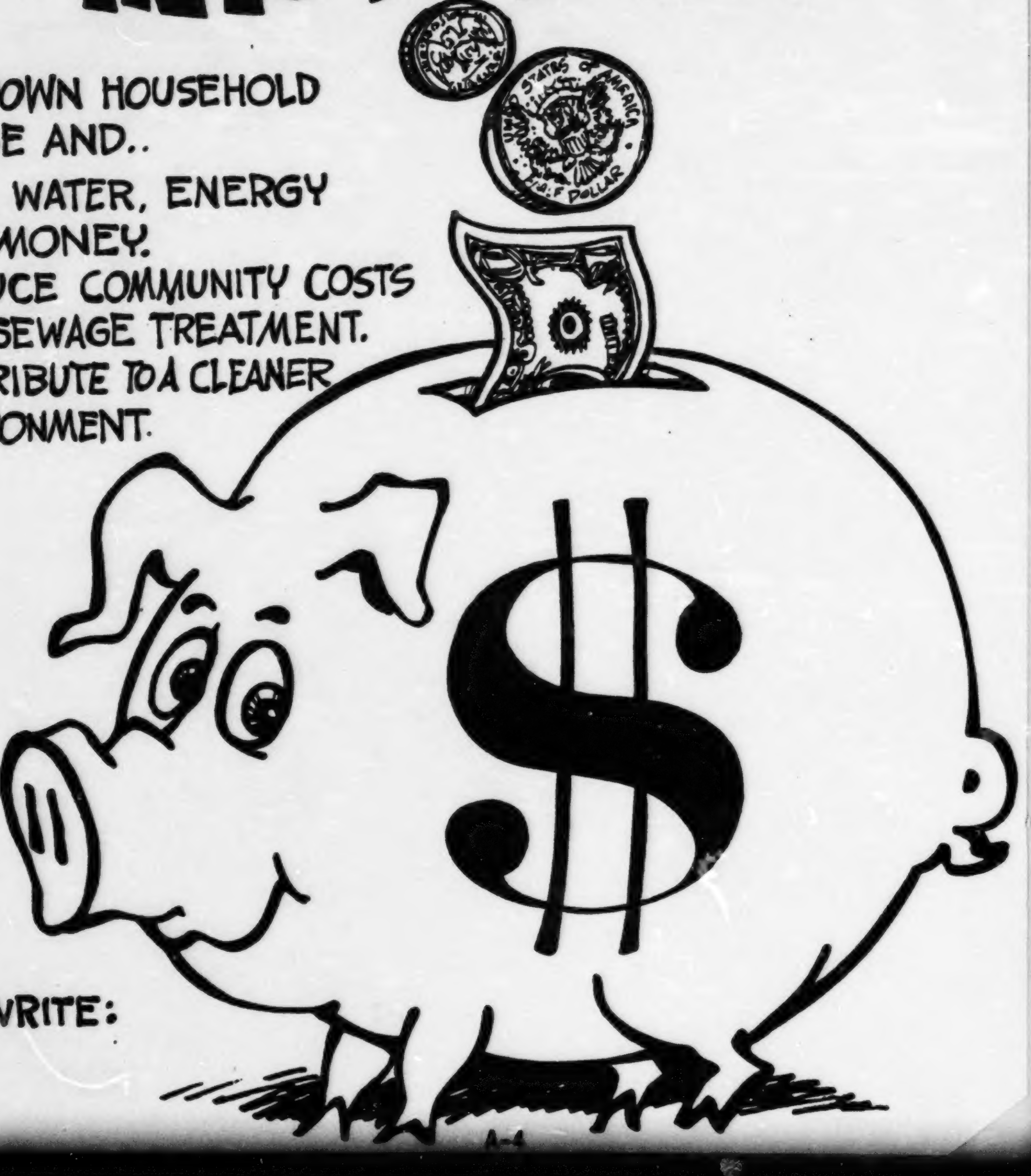
- Five Fact/Work Sheets: "FLOW DOWN: Reduce Faucet Water Use" (Clip Art Pieces No's. 17 and 18 for two-sided printing); "FLOW DOWN: Reduce Shower Water Use" (Clip Art Pieces No's. 19 and 20 for two-sided printing); "FLOW DOWN: Reduce Toilet Water Use" (Clip Art Pieces No's. 21 and 22); "FLOW DOWN: Find and Repair Leaky Toilets" (Clip Art Pieces No's. 23 and 24 for double-sided printing); and, "FLOW DOWN: Find and Repair Leaky Faucets" (Clip Art Pieces No's. 25 and 26 for double-sided printing).

FLOW DOWN!

TURN DROPS INTO DOLLARS..

FLOW DOWN HOUSEHOLD SEWAGE AND..

- SAVE WATER, ENERGY AND MONEY.
- REDUCE COMMUNITY COSTS FOR SEWAGE TREATMENT.
- CONTRIBUTE TO A CLEANER ENVIRONMENT.

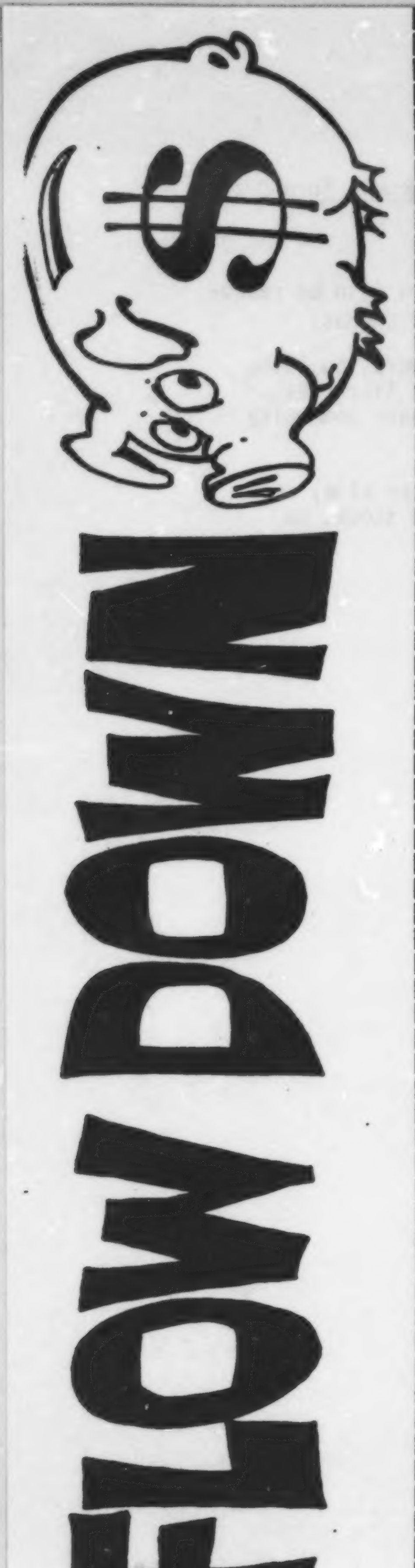

UNITED STATES OF AMERICA
HALF DOLLAR

CALL OR WRITE:

← Clip Art Piece No. 1: Theme Poster "Flow Down! Turn Drops Into Dollars...".

- Size: 8-½ inches wide by 11 inches deep (can be reproduced this size or enlarged to 17 by 22 inches).
- Suggested Uses: Display in local hardware, building supply and plumbing stores, schools and libraries, office buildings, and other places in your community where people gather.

Consider using a colored ink (e.g., water blue) on white paper, or black ink on a colored stock, to achieve a poster effect.


FLOW DOWN

FLOW DOWN

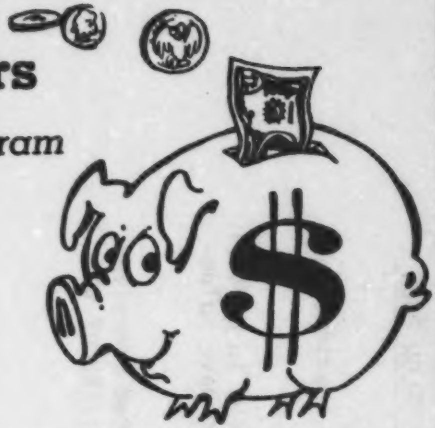
FLOW DOWN

← Clip Art Piece No. 2: Theme Bumper Sticker "FLOW DOWN".

- Size: Three 2-3/4 by 11 inch originals provided on one 8-½ by 11 inch master.
- Suggested Use: Make available for pick-up in central locations (e.g., town hall, library), or have volunteer groups distribute door to door.

  Consider the use of colored ink or colored adhesive-backed paper stock to enhance the visibility of the bumper sticker

Turn Drops into Dollars



Support the "FLOW DOWN" Program

- Flow down household sewage
- Reduce community costs for sewage treatment
- Contribute to a cleaner environment

Watch this space to find out how your household can:

- *Save up to 50% of your energy costs for heating water.*
- *Save 30% or more on your water costs.*
- *Reduce your household sewage by 35,000 gallons a year.*

FLOW DOWN

Guide to Fixing

available from:

← Clip Art Piece No. 3: Teaser Advertisement for FLOW DOWN Program.

- Size: 6 inches wide by 4 inches deep.
- Suggested Uses: Run advertisement in local newspaper, civic group or utility newsletters, and/or local business house organs to elicit curiosity about the program.

  Consider running it for several days in local newspapers so readers will identify the theme and will take note of similar ads (e.g., Clip Art Pieces No's. 4, 5, and 6).

  Contact civic groups and local businesses to secure their support for program and agreement to run ad in the same time period as newspaper ads are running.

← Clip Art Piece No. 4: Advertisement for "Guide to Fixing Leaky Faucets" (one of a series of three similar advertisements).

- Size 3-½ inches wide by 3 inches deep.
- Suggested Uses: Run advertisement in local newspaper, civic group and utility newsletters, and/or local business house organs to announce availability of how-to "Guide to Fixing Leaky Faucets" (Clip Art Pieces No's. 7 and 8).

  Consider asking local hardware and/or building and plumbing supply stores to integrate the ad into their advertising, and to make the how-to guides available at their facility.

FLOW DOWN

available from:

Guide to Inserting Flow Restrictors

FLOW DOWN

available from:

Guide for Reading your Water Meter

← Clip Art Piece No. 5: Advertisement for "Guide to Inserting Flow Restrictors" (one of a series of three similar advertisements).

- Size: 3-½ inches wide by 3 inches deep.
- Suggested Uses: Please see suggested uses for Clip Art Piece No. 4.

  (This piece of clip art advertises the availability of the how-to "Guide for Inserting Flow Restrictors -- Clip Art Pieces No's. 9 and 10).

← Clip Art Piece No. 6: Advertisement for "Guide to Reading Your Water Meter" (one of a series of three similar advertisements).

- Size: 3-½ inches wide by 3 inches deep.
- Suggested Uses: Please see suggested use for Clip Art Piece No. 4.

  (This piece of clip art advertises the availability of the how-to "Guide for Reading Your Water Meter -- Clip Art Pieces No's. 11 and 12).

YOUR PROBLEM:

- Leaking faucets waste water.
- Dripping faucet may cause a spot in the sink.
- Constant dripping is annoying.

WHAT YOU NEED:

- A box of assorted size washers, unless you know the size.
- A screwdriver.
- An adjustable wrench.

FLOW DOWN

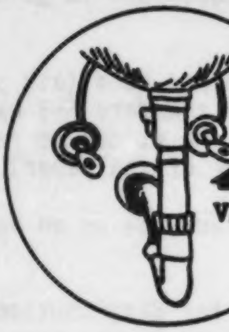
Guide to Fixing Leaky Faucets

← Clip Art Piece No. 7: Side 1 of How-To "Guide to Fixing Leaky Faucets" (one of a series of three how-to guides).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 sheet -- Clip Art Piece No. 8, Side 2, can be reproduced similarly on the other side of the paper).
- Suggested Uses: Fold in thirds and use as an insert to utility bills.

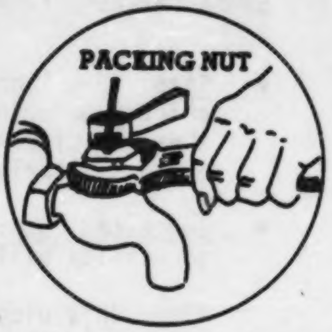
  Also, this piece is appropriate for distribution to potential user groups such as fixed-income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.



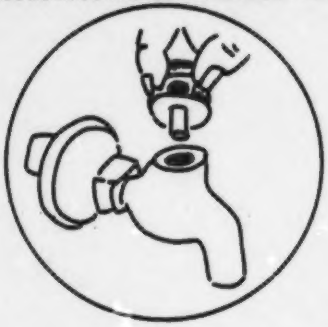
1.

Turn off water at shut off valve nearest to the faucet you are going to repair. Then turn on the faucet until water stops flowing.



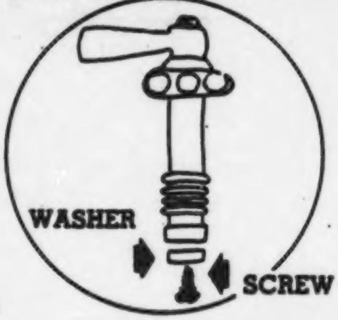
2.

Loosen packing nut with wrench. Most nuts loosen by turning counterclockwise.



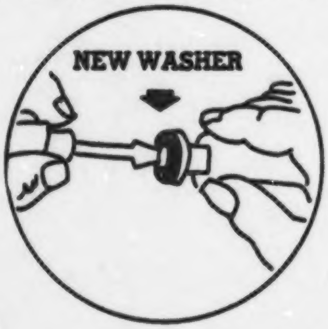
3.

Use the handle to pull out the valve unit.



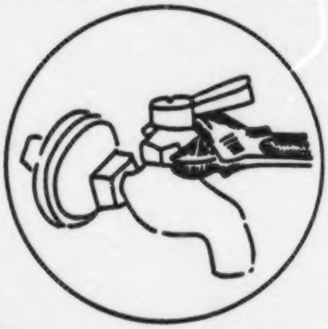
4.

Remove the screw holding the old washer at the bottom of the valve unit.



5.

Put in new washer and replace screw. Put valve unit back on faucet. Turn handle to the proper position.



6.

Tighten the packing nut. Turn on the water at the shutoff valve.

Clip Art Piece No. 8: Side 2 of How-To "Guide to Fixing Leaky Faucets" (one of a series of three how-to guides).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- this piece of clip art will be printed on the reverse side of the Clip Art Piece No. 7, Side 1).

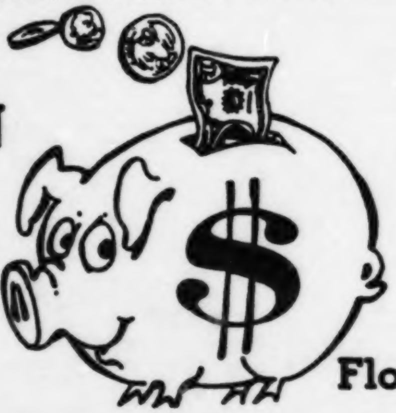
- Suggested Uses: Please refer to uses for Clip Art Piece No. 7.

  Consider also, adding your own logo and message (e.g., "Distributed by the Flow Down Committee as a Public Service"), and print one copy on an 8-½ by 11 inch sheet. In this way, Clip Art Piece No. 8 can be used either in combination with Piece No. 7 or as a separate piece.

WHY INSERT A SHOWER FLOW RESTRICTOR?

- **Your shower may be sending out 5-6 gallons of water a minute — more than you really need.**
- **A flow restrictor can save you 30% or more of your water and energy costs for showering — that can amount to $50 a year.**
- **It's easy to insert — a quick, do-it-yourself job.**

FLOW DOWN



Guide to Inserting Shower Flow Restrictors

← Clip Art Piece No. 9: Side 1 of How-To "Guide to Inserting Shower Flow Restrictors" (one of a series of three how-to guides).

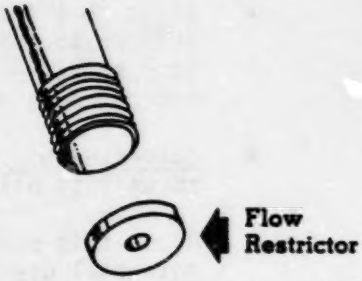
- Size: 5-½ inches wide by 8 inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 10, Side 2, can be reproduced similarly on the other side of the paper).
- Suggested Uses: Fold in thirds and use as an insert to utility bills.

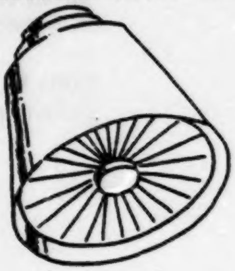
  Also, this piece is appropriate for distribution to potential user groups such as fixed income persons, tenants and landlords, home owners, and mobile park managers.

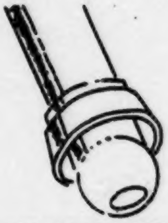
  Consider using colored ink and/or paper for a two-color effect.

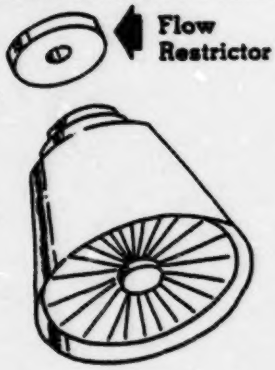
STANDARD SHOWER ARM

- Unscrew the shower head as shown.
- Place flow restrictor in the water line.
- Screw shower head back on.









BALL AND SWIVEL SHOWER ARM

- Remove the shower head as shown.
- Remove the rubber ring if present.
- Place shower restrictor over the ball in the water line.
- Replace the rubber ring, if present.
- Screw shower head back on.

Clip Art Piece No. 10: Side 2 of How-To "Guide to Inserting Shower Flow Restrictors" (one of a series of three how-to guides).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- this piece of clip art will be printed on the reverse side of Clip Art Piece No. 9, Side 1).
- Suggested Uses: Please refer to uses for Clip Art Piece No. 9.

  Consider also, adding your own logo and message (e.g., "Distributed by the Flow Down Committee as a Public Service"), and print one copy on a 8-½ by 11 inch sheet. In this way, Clip Art Piece No. 10 can be used either in combination with Piece No. 9 or as a separate piece.

If your house has a water meter, you can check the plumbing system for leaks in five easy steps:

1. Find the water meter (it may be outdoors or tucked away in a dark corner of the basement).
2. Make sure no water is running.
3. Read the dial (or dials) and record the reading.
4. After 15 or 20 minutes re-check the meter.
5. If the reading has changed, you have a leak. Divide the number of gallons by the elapsed time and you'll know the rate — gallons per minute or per hour — of your water loss.

FLOW DOWN

Guide for Reading your Water Meter

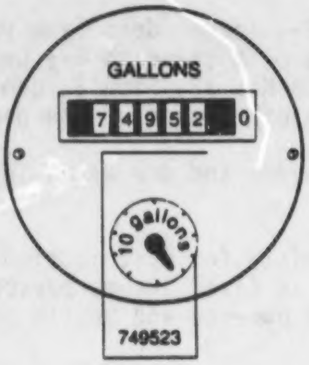
← Clip Art Piece No. 11: Side 1 of How-To "Guide for Reading Your Water Meter" (one of a series of three how-to guides).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 12, Side 2, can be reproduced similarly on the other side of the paper).

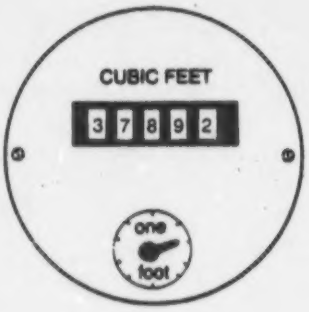
- Suggested Uses: Fold in thirds and use as an insert to utility bills.

  Also, this piece is appropriate for distribution to potential user groups such as fixed income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.

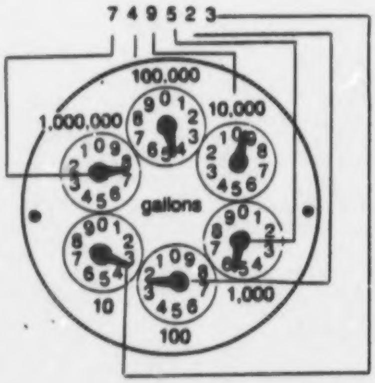

GALLONS
7 4 9 5 2 0
10 gallons
749523

If your meter looks like a car odometer, just read it as you would the car mileage. But note that the last number on the right is a zero, and never changes. It is for tens of gallons, which are recorded by the hand on the small dial.


CUBIC FEET
3 7 8 9 2
one
foot

Should the meter record cubic feet, multiply by 7.5 to convert to gallons of water.

Example: 3 cubic feet x 7.5 = 22.5 gallons


7 4 9 5 2 3
100,000
10,000
1,000,000
gallons
10
100
1,000

Some water meters read like electric meters: they have a set of dials that must be read in series, starting with the dial that records thousands or millions of gallons (or cubic feet).

You'll find the hands move counterclockwise on one dial, then clockwise on the next, and continue to alternate this way.

To get the total gallons, read each dial in turn as shown in the drawing — if the hand is between two numbers, read the lower one.

← Clip Art Piece No. 12: Side 2 of How-To "Guide for Reading Your Water Meter".

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- this piece of clip art will be printed on the reverse side of Clip Art Piece No. 11, Side 1).

- Suggested Uses: Please refer to uses for Clip Art Piece No. 11.

  Consider also, adding your own logo and message (e.g., "Distributed by the Flow Down Committee as a Public Service"), and print one copy on an 8-½ by 11 inch sheet. In this way, Clip Art Piece No. 12 can be used either in combination with Piece No. 11 or as a separate piece.

A 5-MINUTE SHOWER

- Can send 25 or more gallons down the drain.
- Can cost a household $50 to $160 a year for hot water energy.
- You can save 25 - 50% by inserting flow restrictors, installing low flow shower heads, or taking shorter showers and help flow down the sewage.

FLOW DOWN: *Reduce Shower Water Use*

A LEAKY FAUCET

- Can send thousands of gallons of clean water into the sewer each year.
- You can save $25 a year or more by fixing one leaky faucet — and help flow down clean water going into the sewer.

FLOW DOWN: *Find and Repair Leaks*

← Clip Art Pieces No's. 13 and 14: Advertisements to Motivate Reducing Water Use and Flowing Down Amount of Household Sewage -- "FLOW DOWN: Reduce Shower Water Use" and "FLOW DOWN: Find and Repair Leaks" (two of a series of four similar advertisements.

- Size: 3-½ inches wide by 2-½ inches deep.
- Suggested Uses: Run advertisements in local newspaper, civic group and utility newsletters, and/or local business house organs to motivate taking shorter showers and/or installing flow-reducing devices as well as finding and repairing leaky faucets.

  Consider asking local hardware and/or building and plumbing supply stores to integrate the ad into their own advertising, and to make flow-reducing devices (e.g., low-flow shower heads) available at their facility.

  Consider also, printing the advertisements on colored paper and using as utility bill inserts.

A LEAKY TOILET

- Can send up to 90,000 gallons of clean water into the sewers each year.
- Often cannot be seen or heard.
- You can save over $50 a year by fixing a leaky toilet — and help flow down the clean water going into the sewers.

FLOW DOWN: *Find and Repair Leaks*

A STANDARD TOILET

- Can send 36,500 or more gallons of household water into the sewer each year.
- Can easily be fit with toilet dams to save 30% of this water.
- You can save on your water bill — and help flow down the sewage.

FLOW DOWN: *Insert Toilet Dams*

← Clip Art Pieces No's. 15 and 16: Advertisements to Motivate Reducing Water Use and Flowing Down Amount of Household Sewage -- "FLOW DOWN: Find and Repair Leaks" and "FLOW DOWN: Insert Toilet Dams" (two of a series of four similar advertisements).

- Size: 3-½ inches wide by 2-½ inches deep.
- Suggested Uses: Please see suggested uses for Clip Art Pieces No's. 13 and 14.

FLOW DOWN

Reduce Faucet Water Use

A customer service message from

Save up to $45 a year in water and energy costs and Flow down the amount of household sewage

- **Install faucet aerators or spray taps. (Cost: generally $5 or less if you buy and install.) Both are practical and efficient for washing dishes and vegetables.**
- **Install flow restrictors or controllers. (Cost: $1 to $8 if you buy and install.)**
- **Turn faucet off while shaving, brushing teeth, and washing vegetables. (Cost: $0.)**

FAUCET USE FACTS

Typical 4-person household faucet water use: *10,220 gallons a year.*

Typical cost of that faucet water: *$6 or more a year.*

Typical cost of energy to heat that water: (Assume one-fourth of faucet water is hot water)	*$44 a year for electric water heater.** *$15 a year for gas water heater.** *$20 a year for oil water heater.**
Typical savings with a faucet retrofit device:	*30% to 50% or 3,000 to 5,000 gallons of water a year.*

** To calculate your cost and potential savings, turn page*

← **Clip Art Piece No. 17: Side 1 of Fact/Work Sheet "FLOW DOWN: Reduce Faucet Water Use"** (one of a series of five smaller fact/work sheets.

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 18 can be reproduced similarly on the other side of the sheet).

- Suggested Uses: Fold in thirds and use as a utility bill insert.

  Also, this piece is appropriate for distribution to potential users such as fixed-income persons, tenants and landlords, home owners, and mobile park mangers.

  Consider using colored ink and/or paper for a two-color effect.

FIGURING THE YEARLY COST OF FAUCET WATER

To figure your yearly faucet water use, use this formula:

(1) length of time faucet runs per day (in minutes) x gallons per minute (typically 5) x 365 days per year = gallons per year.

To figure your water cost, use the following formula:

$$(2)\quad \frac{\text{gallons per year}}{1{,}000} \times \text{cost per 1,000 gallons} = \text{cost of water}$$

FIGURING THE YEARLY COST OF HOT WATER FOR FAUCETS

To figure how much electricity, gas, or oil it takes to heat household faucet water, assume that one-fourth of the faucet water is hot, and use the following formulas:

$$(3)\quad \frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{3{,}072} = \text{kilowatt hours (of electricity)}$$

$$(4)\quad \frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{65{,}000} = \text{therms (of gas)}$$

$$(5)\quad \frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{85{,}800} = \text{gallons (of oil)}$$

* Average year-round temperature of water coming into the home is about 60°F. Subtracting 60°F from the setting on your water heater gives the "change in temperature" referred to in the formulas.

FIGURING THE YEARLY COST OF FAUCET WATER USE

Add the cost of energy from (3), (4), or (5) to the cost of water from (2) to get:

(6) yearly cost of energy to heat faucet water + yearly cost of water = yearly cost for faucet water.

FIGURING YOUR SAVINGS FROM FLOWING DOWN FAUCET WATER USE

Multiply the total yearly cost in (6) by the proportion of water saved by faucet flow reducing devices (typically 30% to 50%):

(7) yearly cost for faucet water x (.30 or .50) = yearly savings.

Clip Art Piece No. 18: Side 2 of Fact/Work Sheet "FLOW DOWN: Reduce Faucet Water Use" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (to be reproduced, two copies to a standard 8-½ by 11 inch sheet, as the reverse side of Clip Art Piece No. 17).
- Suggested Uses: Please see suggested uses for Clip Art Piece No. 17.

FLOW DOWN:

Reduce Shower Water Use

A customer service message from:

Save up to $50 a year in water use and energy costs
and
Flow down the amount of household sewage

- Insert flow restrictors. (**Cost:** $5 or less if you buy and install.)
- Install low flow shower heads. (**Cost:** $13 or less if you buy and install.)
- Take shorter showers. (**Cost:** $0.)

SHOWER USE FACTS

Typical 4-person household shower use:	*18,250 gallons of water a year.*
Typical cost of that shower water:	*$11 or more a year.**
Typical cost of energy to heat water: (assume half of shower water is hot water and that water heater is set at 140°F)	*$53 a year for gas water heater.** *$71 a year for oil water heater.** *$158 a year for electric water heater.**
Typical savings from reducing shower water use:	*25% to 50% or 4,500 to 9,000 gallons of water each year.*

**To calculate your cost and savings, turn the page.*

← Clip Art Piece No. 19: Side 1 of Fact/Work Sheet "FLOW DOWN: Reduce Shower Water Use" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 20 can be reproduced similarly on the other side of the sheet).
- Suggested Uses: Fold in thirds and use as a utility bill insert.

  Also, this piece is appropriate for distribution to potential users such as fixed-income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.

FIGURING THE YEARLY COST OF SHOWER WATER

To figure your yearly water use for showers, use the following formula:

(1) (showers per day) x (minutes per shower) x (gallons per minute) (typically 5) x (365 days per year) = gallons per year

To figure your water cost, use the following formula:

(2) $$\frac{\text{gallons per year}}{1{,}000} \times \text{cost per 1,000 gallons} = \text{cost of water}$$

FIGURING THE YEARLY COST OF HOT WATER FOR SHOWERS

To figure how much electricity, gas, or oil it takes to heat household shower water, assume half of the shower water is hot, and use the following formulas:

(3) $$\frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{3{,}072} = \text{kilowatt hours (of electricity)}$$

(4) $$\frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{65{,}000} = \text{therms (of gas)}$$

(5) $$\frac{\text{gallons of hot water} \times 8.33 \times \text{change in water temperature}^{*}}{85{,}800} = \text{gallons (of oil)}$$

Multiply your answer by the rate on a current energy bill to determine how much you pay for a hot water leak.

** Average year-round temperature of water coming into the house is about 60°F. Subtracting 60°F from the setting on your water heater gives the "change in temperature" referred to in the formula.*

FIGURING THE YEARLY COST OF SHOWER WATER USE

Add the cost of energy from (3), (4), or (5) to the cost of water from (2):

(6) yearly cost of energy to heat shower water + yearly cost of water = yearly cost of shower water.

FIGURING YOUR SAVINGS FROM FLOWING DOWN SHOWER WATER USE

Multiply the total yearly cost in (6) by the proportion of water saved by inserting flow restrictors, installing low flow shower heads or taking shorter showers (typically 25 to 50%):

(7) yearly cost of shower water x (.25 or .50) = yearly savings.

Clip Art Piece No. 20: Side 2 of Fact/Work Sheet "FLOW DOWN: Reduce Shower Water Use" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (to be reproduced, two copies to a standard 8-½ by 11 inch sheet, as the reverse side of Clip Art Piece No. 19).
- Suggested Uses: Please see suggested uses for Clip Art Piece No 19.

FLOW DOWN

Reduce Toilet Water Use

A customer service message from

Save up to $10 a year in water costs
and
Flow down the amount of wastewater entering the sewer

- Install toilet dams. (Cost: about $5 a pair.)
- Fill 2 quart-size plastic bottles with water and a few clean stones. Set in toilet tank. (Cost: $0.)
- Install a shallow trap toilet when remodeling. (Cost: same as conventional models.)

TOILET WATER USE FACTS

Yearly toilet water use for a 4-person household: *36,500 to 51,000 gallons.*

Yearly water saved by reducing toilet water use: *Up to 30% or 10,950 to 15,300 gallons by installing toilet dams.*

Typical yearly cost for toilet water : *$22 - $31.**

* *To calculate your cost and possible savings, turn page.*

← Clip Art Piece No. 21: Side 1 of Fact/Work Sheet "FLOW DOWN: Reduce Toilet Water Use" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 22 can be reproduced similarly on the other side of the sheet).
- Suggested Uses: Fold in thirds and use as a utility bill insert.

  Also, this piece is appropriate for distribution to potential users such as fixed-income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.

FIGURING YOUR YEARLY TOILET WATER USE

You can estimate your toilet water use using the following rules of thumb:
- The average standard model toilet uses 5-7 gallons per flush.
- Each individual in the household flushes 5 times a day.

Now apply the following formula:
(1) number of persons in household x gallons of water per flush x number of flushes per person per day x 365 days per year = yearly household toilet water use.

FIGURING YOUR YEARLY TOILET WATER COST

To figure your yearly toilet water cost, use the following formula:

$$(2) \quad \frac{\text{gallons of water per year}}{1{,}000} \times \text{rate per 1,000 gallons} = \text{yearly cost for toilet water.}$$

THINKING ABOUT POTENTIAL SAVINGS

In the Washington, D.C. suburbs (June 1980):
- Water cost was 90¢ per 1,000 galons.
- Sewer cost was $1.10 per 1,000 gallons.

If yearly toilet water use for a 4-person household in that suburb was 36,500 to 51,000 gallons:
- Yearly water costs were between $33-$46/year.
- Yearly sewer costs were between $40-$56/year.

By installing toilet dams and reducing water use by 1.5 gallons per flush:
- Yearly water saved in 4-person household was 10,950 gallons.
- Yearly water and sewer costs were reduced by $21.90.

← Clip Art Piece No. 22: Side 2 of Fact/Work Sheet "FLOW DOWN: Reduce Toilet Water Use" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (to be reproduced, two copies to a standard 8-½ by 11 inch sheet, as the reverse side of Clip Art Piece No. 21).
- Suggested Uses: Please see suggested uses for Clip Art Piece No. 21.

FLOW DOWN:

Find and Repair Leaky Toilets

A customer service message from:

Save $50 a year or more in water costs by repairing a leaky toilet and Flow down the amount of clean water going into sewers

- Buy a bottle of red food coloring at the grocery store. (Cost: less than $1.)
- Put about 12 drops of food coloring into the tank.
- Wait 10 to 15 minutes.
- If red shows up in the toilet bowl, you have a leak.

LEAKY TOILET FACTS

Clean water going into the sewer from one leaky toilet: *up to 90,000 gallons a year.*

Toilet leaks generally cannot be seen or heard: *utilities recommend the dye test to detect toilet leaks.*

Typical cost of toilet leak: *about $55 a year in water costs (assuming a 90,000 gallon leak).**

**To calculate your cost and potential savings, turn the page.*

← Clip Art Piece No. 23: Side 1 of Fact/Work Sheet "FLOW DOWN: Find and Repair Leaky Toilets" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 24 can be reproduced similarly on the other side of the sheet).

- Suggested Uses: Fold in thirds and use as a utility bill insert.

  Also, this piece is appropriate for distribution to potential users such as fixed-income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.

FIGURING YOUR WATER LOSS FROM A LEAKY TOILET

Estimate your water loss using the following rules of thumb:

- A "running toilet" can waste 4 gallons an hour — 96 gallons a day.
- Toilets with "silent leaks" can use up to 250 gallons a day. If you know how to read your water meter, you may be able to get a more precise estimate. However, some slow leaks go undetected by a water meter.

FIGURING YOUR YEARLY WATER COST

To figure your yearly water cost, use the following formula:

$$\frac{\text{gallons lost per day} \times 365 \text{ days}}{1{,}000} \times \text{rate per } 1{,}000 \text{ gallons} =$$

yearly cost of water from "running toilets" or "silent leaks"

THINKING ABOUT POTENTIAL SAVINGS

In the Washington, D.C. suburbs (June 1980):
- Water cost was 90¢ per 1,000 gallons.
- Sewer cost was $1.10 per 1,000 gallons.

If a "running toilet" in that suburb used 96 gallons a day:
- Yearly water costs were $32.
- Yearly sewer costs were $39.

If a "silent leak" used 250 gallons a day:
- Yearly water costs were $82.
- Yearly sewer costs were $100.

← Clip Art Piece No. 24: Side 2 of Fact/Work Sheet "FLOW DOWN: Find and Repair Leaky Toilets" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (to be reproduced, two copies to a standard 8-½ by 11 inch sheet, as the reverse side of Clip Art Piece No. 23).

- Suggested Uses: Please see suggested uses for Clip Art Piece No. 23.

FLOW DOWN:

Find and Repair Leaky Faucets

A customer service message from:

Save $25 a year or more in water use and energy costs
and
Flow down the amount of clean water in sewers

- Check seldom used taps in the basement. (**Cost:** your time.)
- Check utility faucets. (**Cost:** your time.)
- Check garbage disposal couplings. (**Cost:** your time.)
- Repair or replace old fittings. (**Cost:** supplies and your time or that of your plumber.)

LEAKY FAUCET FACTS

Clean water down the drain from one leak: *700 to 33,000 gallons a year.*
Typical cost of leaks in a household: *10% of your water bill.**
Typical energy cost for hot water leak:
(assuming a 4,500 gallon per year leak, and that water heater is set at 140°F)
*$27 a year for gas heater.**
*$35 a year for oil heater.**
*$78 a year for electric heater.**

**To calculate your cost and potential savings, turn page.*

← Clip Art Piece No. 25: Side 1 of Fact/Work Sheet "FLOW DOWN: Find and Repair Leaky Faucets" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (ask your printer to print two copies on a standard 8-½ by 11 inch sheet -- Clip Art Piece No. 26 can be reproduced similarly on the other side of the sheet).
- Suggested Uses: Fold in thirds and use as a utility bill insert.

  Also, this piece is appropriate for distribution to potential users such as fixed-income persons, tenants and landlords, home owners, and mobile park managers.

  Consider using colored ink and/or paper for a two-color effect.

FIGURING THE YEARLY COST OF WATER LOST FROM ONE LEAK

Examine leak and estimate water loss using the following rules of thumb:

- **A slow drip = 700 gallons a year.**
- **A slow steady drip = 4,200 gallons a year.**
- **A fast drip = 7,200 gallons a year.**
- **A small stream = 24,000 to 32,400 gallons a year.**

To figure your water cost, use the following formula:

$$(1)\quad \frac{\text{gallons of water lost}}{1{,}000} \times \text{rate per 1,000 gallons} = \text{cost of water}$$

FIGURING THE YEARLY COST OF ENERGY FOR A HOT WATER LEAK

To figure out how much electricity, gas, or oil it takes to heat the water cost in one leak, use the following formulas:

$$(2)\quad \frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^{*}}{3{,}072} = \text{kilowatt hours (of electricity)}$$

$$(3)\quad \frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^{*}}{65{,}000} = \text{therms (of gas)}$$

$$(4)\quad \frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^{*}}{85{,}800} = \text{gallons (of oil)}$$

Multiply your answer by the rate on a current energy bill to determine how much you pay for a hot water leak.

* *Average year-round temperature of water coming into the house is about 60°F. Subtracting 60°F from the setting on your water heater gives the "change in temperature" referred to in the formula.*

FIGURING THE TOTAL YEARLY COST OF A HOT WATER LEAK

Add the cost of energy from (2), (3) or (4) above to the cost of water from (1):

(5) yearly cost of water + yearly cost of energy = yearly cost of hot water leak

← Clip Art Piece No. 26: Side 2 of Fact/Work Sheet "FLOW DOWN: Find and Repair Leaky Faucets" (one of a series of five similar fact/work sheets).

- Size: 5-½ inches wide by 8-½ inches deep (to be reproduced, two copies to a standard 8-½ by 11 inch sheet, as the reverse side of Clip Art Piece No. 25).
- Suggested Uses: Please see suggested uses for Clip Art Piece No. 25.

Appendix B

ASSUMPTIONS AND CALCULATIONS USED IN DEVELOPING FACT/WORK SHEETS IN APPENDIX A ON SAVINGS FROM FLOW REDUCTION

Understanding the assumptions and calculations used in developing the fact and work sheets for the clip art package will allow you to develop fact/work sheets more specific to your community if you so choose. The calculations are simple and easily adaptable to suit your community's characteristics. These assumptions and calculations pertain to water and energy rates, water temperature, water heating efficiency, the amount of energy required to heat water, and cost savings resulting from the savings of water and energy.

- Water rates. A water rate of 60¢ per 1,000 gallons is assumed, based on a typical average cost of 60¢/1,000 gallons for water supply (U.S. EPA, 1979). This cost can be adjusted to reflect the costs actually paid by water users of a particular community. Actual community costs should be available from the local water utility.

- Energy rates. Energy rates used for electricity, gas, and oil are as follows:

    - 8¢ per kWh for electricity.
    - 57¢ per therm for gas.
    - $1.00 per gallon for oil.

  Actual rates for a specific community should be available from the electric utility serving the area.

- Water temperature. The amount of energy required to heat water to a certain temperature will vary depending upon the water's ambient temperature. Energy use described in the Appendix A material is based on a typical ambient water temperature of 60°F and water heater setting of 140°F. Thus, water is being heated 80°F.

- Efficiency of water heaters. Heating water for domestic use involves inefficiencies that must be taken into account in calculating hot water energy use. Depending upon factors such as the type of fuel used in heating water and the amount of insulation around the water heater, these inefficiencies may be substantial. The efficiency factors used for the Appendix A material account for heat lost in the process of heating the water itself and heat loss from a water tank with no extra insulation:

  - electric water heaters: 90% efficiency.
  - gas water heaters: 65% efficiency.
  - oil water heaters: 65% efficiency.

- Energy required to heat water. The basic formula used in calculating hot water energy use in Appendix A takes the form

$$\frac{\text{Gallons of hot water} \times 8.33 \times \text{change in water temperature}}{\text{factor converting energy to appropriate units}}$$

  where each component of the formula is interpreted as follows:

  - gallons of hot water refers to the number of gallons being heated for a given use or the number of gallons saved from a conservation measure.
  - 8.33 Btu's of gas are needed to raise one gallon of water one degree Fahrenheit.
  - change in water temperature refers to the number of degrees the water is being heated from its ambient temperature to the temperature setting of the water heater. Appendix A material assumes this temperature change to be 80°; water is heated from an ambient level of 60° to 140°, a typical water heater setting. A different temperature change can be used where ambient water temperature differs from 60°F.
  - the conversion factor in the denominator accomplishes two tasks: (1) the energy expressed in Btu's is converted to kWh's of electricity, therms of gas, or gallons of oil, as appropriate, and (2) the efficiency of heating water is taken into account by using the factors .90 for electricity, .65 for gas, and .65 for oil.

For example, there are 3.413 Btu's/kWh and heating with electricity is 90% efficient. Thus, the conversion factor for electricity is 3,413 kWhs x .9 = 3,072 kWh's.

- Translating energy savings into dollar savings. Calculating dollar savings from hot water energy saved simply involves multiplying the quantity of energy saved (in kWh's, therms or gallons, as appropriate) by the fuel rate.

  For example, a savings of 800 kWh's at a rate of 8¢/kWh yields a savings of 800 kWh's x 8¢/kWh = $64.

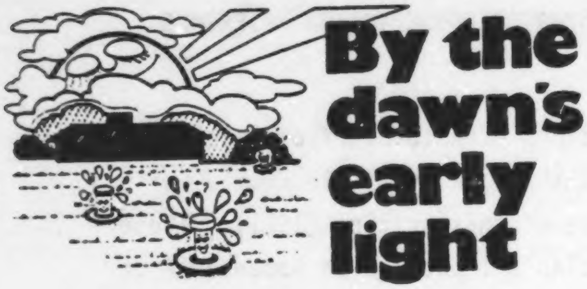
- Calculating Total Cost Savings From Flow Reduction Measures. The total cost savings from specific flow reduction measures or groups of measures is the sum of the savings in water costs (water saved x water rate) and energy costs (energy saved x fuel rate). Where sewer charges are applied to water users based on the quantity of water used, saving water also results in savings on sewer costs. Total cost savings for residents in these communities would consist of water, sewer and energy cost savings.

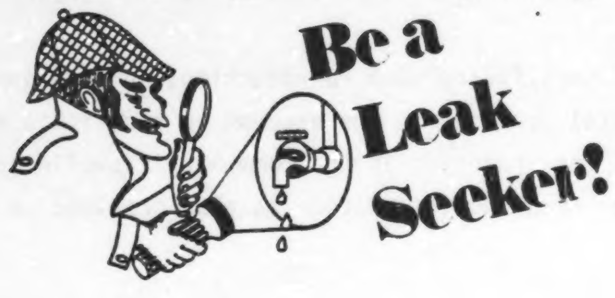
Appendix C

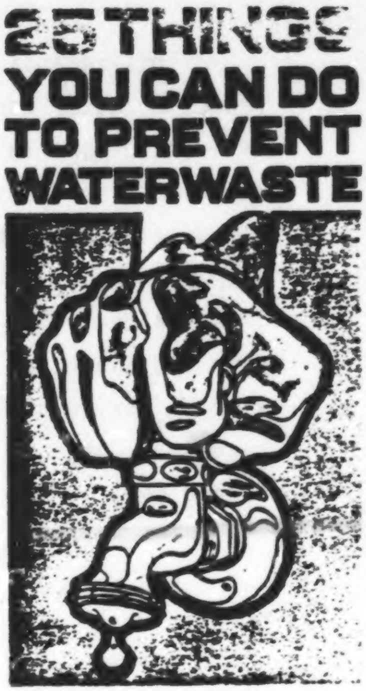
MINI-CATALOG OF FLOW REDUCTION/WATER CONSERVATION MATERIALS

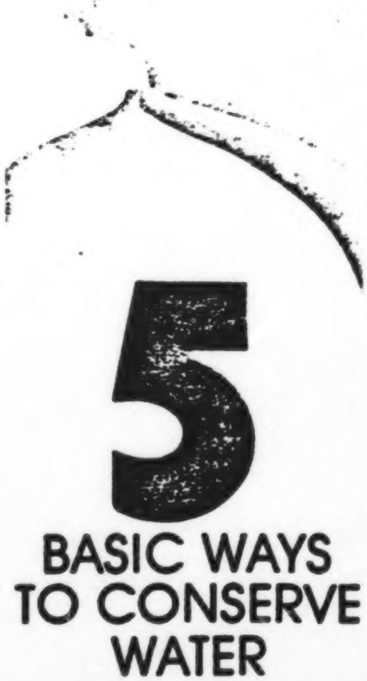
This appendix contains reproductions of excerpts from selected flow reduction/water conservation materials that are available from a variety of institutions in the U.S. at the time of this writing (1981). These materials can be used to augment the clip art package in Appendix A or to serve as a basis for developing another type of public education program for the community.

On the right-hand page facing each reproduction, information is provided about the item(s) depicted in the excerpt to facilitate evaluation of its suitability for inclusion in the community's public education program. Cost and other ordering information is also provided on the facing page.


By the dawn's early light


Be a Leak Seeker!


25 THINGS YOU CAN DO TO PREVENT WATERWASTE


5 BASIC WAYS TO CONSERVE WATER

Invoice and Correspondence Stuffers.
For purchases over 500 of any of the items in this group, you may have your utility's name and address and phone number imprinted at a nominal charge.

Water Conservation Pamphlet Series.
This series of colorfully helpful envelope stuffers is designed to make customers aware of the true value of drinking water. The uniform theme is that people should use all the water they need, but use it wisely, not wastefully. Two four-page leaflets—"Be a Leak Seeker" and "By The Dawn's Early Light"—are printed on brightly colored paper for maximum impact at minimum cost. Two eight-page folders—"5 Basic Ways to Conserve Water and" "25 Things You Can Do"—are printed in full color. Samples available on request. Order the following catalog numbers:

By the Dawn's Early Light ..	No. 70011
Be a Leak Seeker	No. 70012
25 Things You Can Do	No. 70013
5 Basic Ways	No. 70014

Quantity	30-999	1,000-4,999	5,000-24,999	25,000+
No. 70011	.05	.045	.04	**
No. 70012	.05	.045	.04	**
No. 70013	.10	.08	.06	**
No. 70014	.10	.08	.06	**

Conserve Water Reminder Stickers.
Another type of envelope stuffer is this sheet of seven cartoon stickers. The individual stickers peel easily from a paper backing and emphasize the "Use, But Don't Abuse" theme. Utility customers are encouraged to display the stickers near showers, household faucets, washing machines, garden hose connection, etc. Samples available on request .... No. 70015

Quantity	30-999	1,000-4,999	5,000-24,999	25,000+
No. 70015	.10	.08	.06	**

Water Conservation at Home Booklet.
This professionally designed, four-color, 16-page booklet is 3¼" × 6½." It dramatically but entertainingly drives home the importance of conserving water at home. Eye-catching drawings throughout add to its appeal. Samples available on request .... No. 70006

Quantity	30-999	1,000-4,999	5,000-24,999	25,000+
No. 70006	.17	.14	.12	**

** Volume discount prices available on request.

American Water Works Association

Items. Please see description on facing page. (All items bear AWWA copyright.)

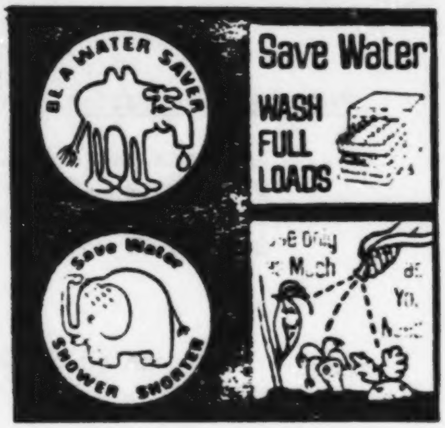
Ordering Information. Write to:

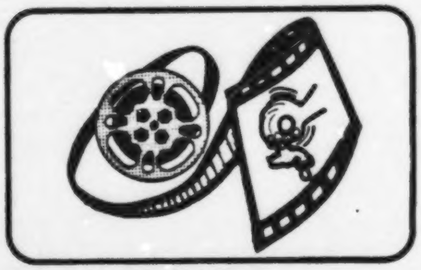
American Water Works Association
Data Processing Department
6666 W. Quincy Avenue
Denver, CO 80523

Cost. As indicated on the facing page.

Additional Information. The AWWA issues an annual publication catalog. The excerpt on the facing page is reproduced from its 1981 catalog. Publication catalogs for subsequent years can be obtained by writing to the above address. EPA appreciates AWWA's permission to advertise the availability of these materials in this document.

Water Conservation at Home...





Water Conservation Films.
Color public service announcements for television on water conservation. Includes first-place award winners in Public Relations Society of America competition (*). Series stresses uniform theme—"Use all the water you need, but use it wisely." All spots 16mm sound film, 30 seconds. $35.00 each.

***Orangutans—**
"And now, good people let's have a little review of some ways to save water." .... **No. 70026**

Pantomime—
"Some of us are blessed with an abundance of water." ... **No. 70027**

Homeowner—
"Hey, there. Did you know that every day every one of us uses 60 gallons of water"? ...... **No. 70028**

Cowboy—
"Back awhile, this country had a lot of unfriendly land." .. **No. 70029**

***Gooney Bird—**
"Sometimes it seems like we'll never run out of water." .... **No. 70030**

People—
"It takes a lot of doing by a lot of people to get safe, clean water to your home." .... **No. 70031**

Magician—
"Sometimes things just disappear. Take water." .... **No. 70032**

Complete Set—
(save 20 percent) $200..,.. **N0. 70033**

Why Water Works—
The first and only pamphlet and slide show that tells graduating high school students why a career in the water supply industry makes sense. Utilities can use the pamphlets as hand-outs and the slide show for personal appearances at high school career day events or similar job-counselling programs. Slide show is designed so you can insert your own local slides and job descriptions. .... **No. 70034**

Pamphlets	
1-24	25¢ each
25-49	20¢ each
50-99	18¢ each
100+	16¢ each
Slide Show: 31 slides and script	$25.00

Water Follies—
An international award-winning full-color cartoon movie that convinces audiences of the benefits of water conservation. Music and sound effects support the comical characters as they demonstrate good and bad conservation habits; there's no language barrier because the message is seen, not narrated. 7½ minutes long in 16mm color sound film. $150.00 .... **No. 80050WF**

← American Water Works Association

Items. Please see description on facing page. (All items bear AWWA copyright.)

Ordering Information. Write to:

American Water Works Association
Data Processing Department
6666 W. Quincy Avenue
Denver, CO 80523

Cost. As indicated on the facing page.

Additional Information. The AWWA issues an annual publication catalog. The excerpt on the facing page is reproduced from its 1981 catalog. Publication catalogs for subsequent years can be obtained by writing to the above address. EPA appreciates AWWA's permission to advertise the availability of these materials in this document.

Easy ways to SAVE WATER MONEY & ENERGY at home

"Motorists who drive blocks out of their way to save 4¢ a gallon at a cut-rate gas station never dream they may be wasting 4¢ a minute in the shower . . . .

"By investing in five simple, water-conserving devices, I've been saving $11 a month on water and energy bills—for just one person!"

UNITED STATES OF AMERICA
TEN
TEN DOLLARS
ONE CENT

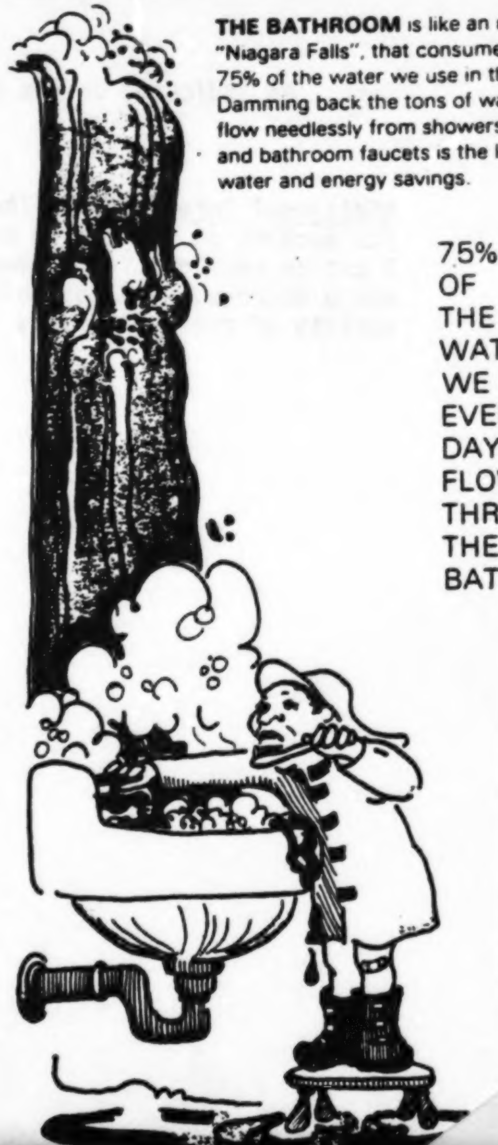
written by Edwin F. Wesely, Jr.

illustrated by Billie Sturgeon
Julie Flaherty
Suzie Potter

©POTOMAC RIVER & TRAILS COUNCIL
12 South Market Street
Frederick, Maryland 21701
1981

produced by Grant #T901057010 from
the U.S. Environmental Protection Agency

HOW TO SAVE WATER



THE BATHROOM is like an in
"Niagara Falls", that consumes
75% of the water we use in the
Damming back the tons of wat
flow needlessly from showers,
and bathroom faucets is the ke
water and energy savings.

75%
OF
THE
WATE
WE U
EVER
DAY
FLOV
THRC
THE
BATH

← Potomac River and Trails Council

Item. Handbook entitled "Easy Ways to Save Water, Money, and Energy at Home."

Availability. Single or multiple copies of 100,000 or more available as of August 1981.

Ordering Information. Write to:

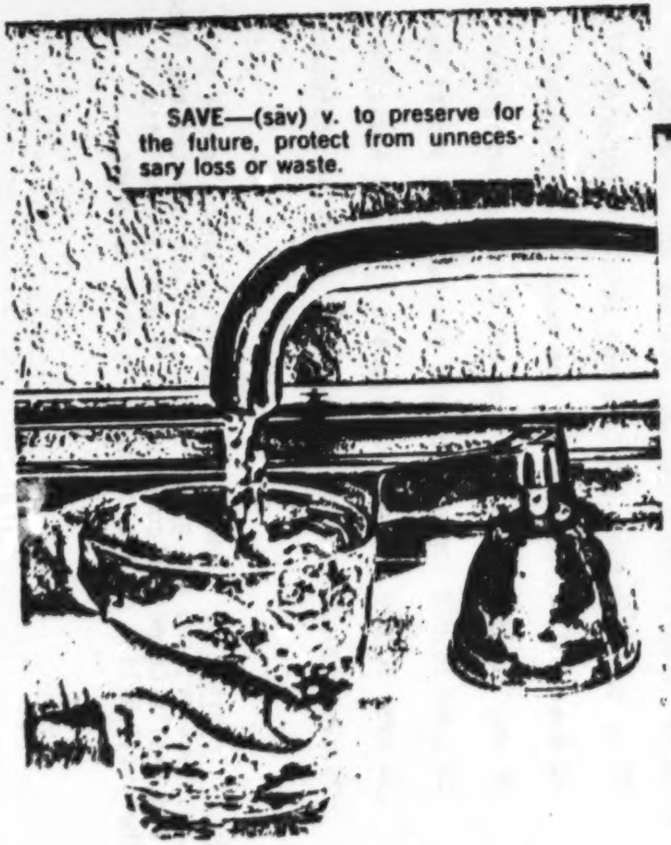
Potomac River Trails Council
Mr. Ed Wesely
12 South Market Street
Frederick, MD 21701

Cost. (1981 prices):

$1.35	for single copy (includes postage and handling).
.50	up to 100 copies (postage and handling additional).
.40	over 100 copies (postage and handling additional).
.37	over 1,000 copies (postage and handling additional).
.35	over 10,000 copies (postage and handling additional).
.30	over 50,000 copies (postage and handling additional).
.25	over 100,000 copies (postage and handling additional).

Additional Information. Contains up-to-date, useful range of costs for water, wastewater, and energy services. EPA appreciates the Potomac River and Trails Council's cooperation in granting permission to advertise the availability of its handbook in this document.

Reproduced from
best available copy.



SAVE—(sāv) v. to preserve for the future, protect from unnecessary loss or waste.

WASTE (wāst) v. to use unnecessarily, to squander.

IT'S UP TO YOU!

A CUSTOMER

HANDBOOK

ON

WATER-SAVING

AND

WASTEWATER-REDUCTION

PUBLISHED AS A PUBLIC SERVICE BY

THE WASHINGTON SUBURBAN
SANITARY COMMISSION

Revised May, 1976

← The Washington Suburban Sanitary Commission

Items. Handbooks (bearing WSSC copyright):

- "Water-Saving and Waste Reduction Handbook for Apartment Residents"
- "A Customer Handbook on Water-Saving and Wastewater-Reduction"

Availability. Copies available upon request as of August 1981.

Ordering Information. Write to:

Washington Suburban Sanitary Commission
Public Information Office
4017 Hamilton Street
Hyattsville, MD 20781

Cost. Cost of printing and mailing pamphlets (about $1 in August 1981).

Additional Information. EPA appreciates the Washington Suburban Sanitary Commission's cooperation in granting permission to advertise the availability of these materials in this document.

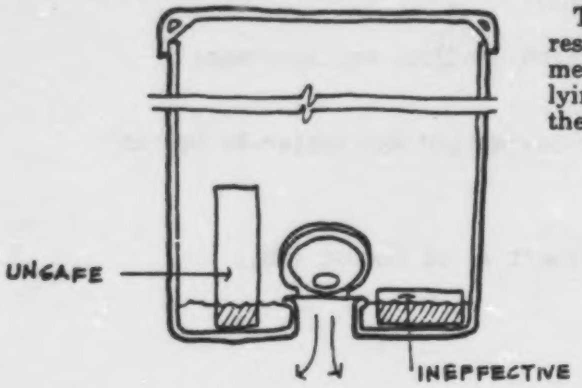
Reduced Flush Devices

It is likely that your toilet's water closet contains from five to seven gallons of water, and that some of this water is not needed for most flushing requirements. Devices such as dams, bottles and manual flush mechanisms are available which can allow an adequate but reduced-quantity flush.

★DAMS, BOTTLES

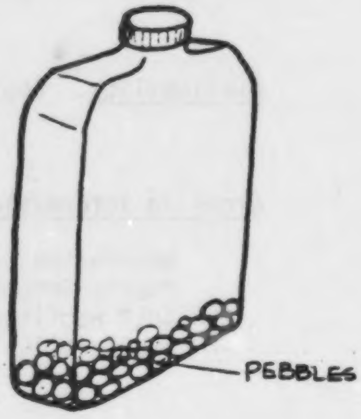
Objects placed in a conventional toilet tank to reduce the volume do not change the water level, or head, when the tank is full. This allows the flush water to maintain the same effective velocity.

The simplest example is a brick. When placed in the tank, i rests on the bottom displacing a volume of water equal to its cubi measurement. Most tanks do not empty completely, so a brick lying on the bottom of the tank is almost useless. If stood on en there is a real danger it will tip over and crack the tank.

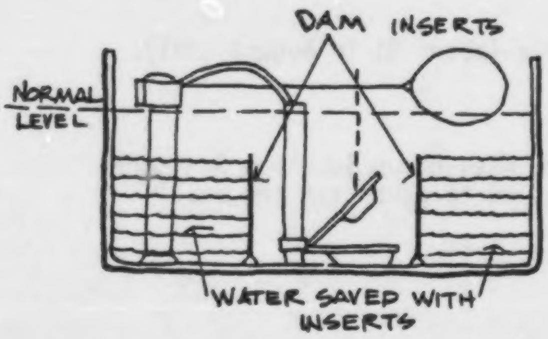


BRICKS

Better than a brick is a plastic bottle filled with water and weighted with pebbles. Pebbles weigh the bottle down to keep it from interfering with toilet mechanisms.



PLASTIC BOTTLE



Plastic dams prohibit a gallon or more of water from flushing Care should be taken when installing the dam devices. If dam (bottles, too) work free, they can interfere with toilet mechanism and cause more wasteage than they can save. But workin properly, these devices can save considerable amounts of water

★ DUAL FLUSH

Dual flush devices make it possible to select an appropriate amount of flushing water needed for either solid or liquid wastes. There are many possible configurations.

One device is a weight that is attached to the tank ball so that when the trip lever is released, the tank ball immediately drops to end the flush cycle. A lead weight inserted in the flapper works this way.

Another device involves a single handle which is pressed in one direction for a partial flush and in the other direction for a full flush.

Santa Clara Valley Water District
5750 Almaden Expressway, San Jose 95118, Phone 265-2600

Santa Clara County, California

Items. How to Fact Sheets:

- "How to Fix Leaky Faucets" (text and illustrations)
- "Toilets: Fix Leaks & Reduce Flush" (text and illustrations)
- "Save Water With a Shower" (text only)
- "Stop the Water Bandit" (stickers and pins)

Availability. Limited quantities (up to five of each piece)

Ordering Information. Write to:

Santa Clara Valley Water District
Public Information Office
5750 Almaden Expressway
San Jose, CA 95118

(408) 265-2600

Cost. None as of August 1981.

Additional Information. The how-to fact sheets are appropriate for use as handouts or utility bill inserts. They are considerably more detailed than the how-to series provided in the clip art package (Appendix A). EPA appreciates Santa Clara County Water District's cooperation in granting permission to advertise the availability of these materials in this document.

Department of Water Resources
P. O. Box 388 Sacramento 95802
(916) 445-8228

WATER CONSERVATION information bulletin

TOILET DAMMING DEVICES

Toilet dams save water by blocking off part of the toilet tank, requiring less water to fill the remaining part. Savings can range as high as two gallons per flush. These devices do not change the water level when the tank is full thus allowing the flush water to maintain the same effective velocity. A properly installed device can save as much as 5 to 10 percent of the fresh water used within a home. This is a partial list of devices on the market. The list is not comprehensive, and listing does not constitute an endorsement or a guarantee by the California Department of Water Resources. If any devices have been omitted from the list, the Department would like to be informed. Check your telephone directory or a local plumbing dealer for the devices you want.

Note: Federal policy prohibits the listing of individual manufacturers. For information on how to obtain this and other "information bulletins", please see facing page.

(REV. 3-77)

Save Water - Save Energy - Save Money

California Department of Water Resources

Items. Information Bulletins on Manufacturers and/or Distributors:

- "Toilet Damming Devices"
- "Low Flush Toilets"
- "Low Volume Shower Heads and Adapters"
- "Automatic Dishwashers"
- "Automatic Clothes Washers"
- "Faucet Flow Controls"
- "Toilet Flush Adapters"

Availability. Upon request as of August 1981.

Ordering Information. Write to:

Department of Water Resources
Mr. John Engdahl
P.O. Box 388
Sacramento, CA 95802

Cost. None as of August 1981.

Additional Information. EPA appreciates the California DWR's cooperation in allowing advertisement of the availability of these information bulletins.

MANUFACTURERS AND/OR DISTRIBUTORS OF WATER-SAVING DEVICES

This is a listing of those items which are recognized as "retrofit" products, that is, they may be added to existing faucets, showers, toilets, and certain other parts of your indoor plumbing systems. The installation of these devices will reduce costs for water, sewage treatment and energy.

The listing of any product does not constitute an endorsement by the State of Illinois.

Provided by the Department of Local Government Affairs with funding assistance from Illinois Environmental Protection Agency and the Division of Water Resources, Illinios Department of Transportation.

Did we overlook a manufacturer? If we did, would you let us know!

Illinois Interagency Water Management/
Conservation Committee
303 East Monroe
Springfield, IL 62706

WISE WATER USE IS GOOD FOR THE SYSTEM

WATER SYSTEM
ENERGY SYSTEM

SEWER SYSTEM
ECO SYSTEM

ECONOMIC SYSTEM

← Illinois Interagency Water Management/Conservation Committee

Item. List of where to obtain devices for retrofit: "Manufacturers and/or Distributors of Water-Saving Devices"

Availability. Upon request as of August 1981.

Ordering Information. Write to:

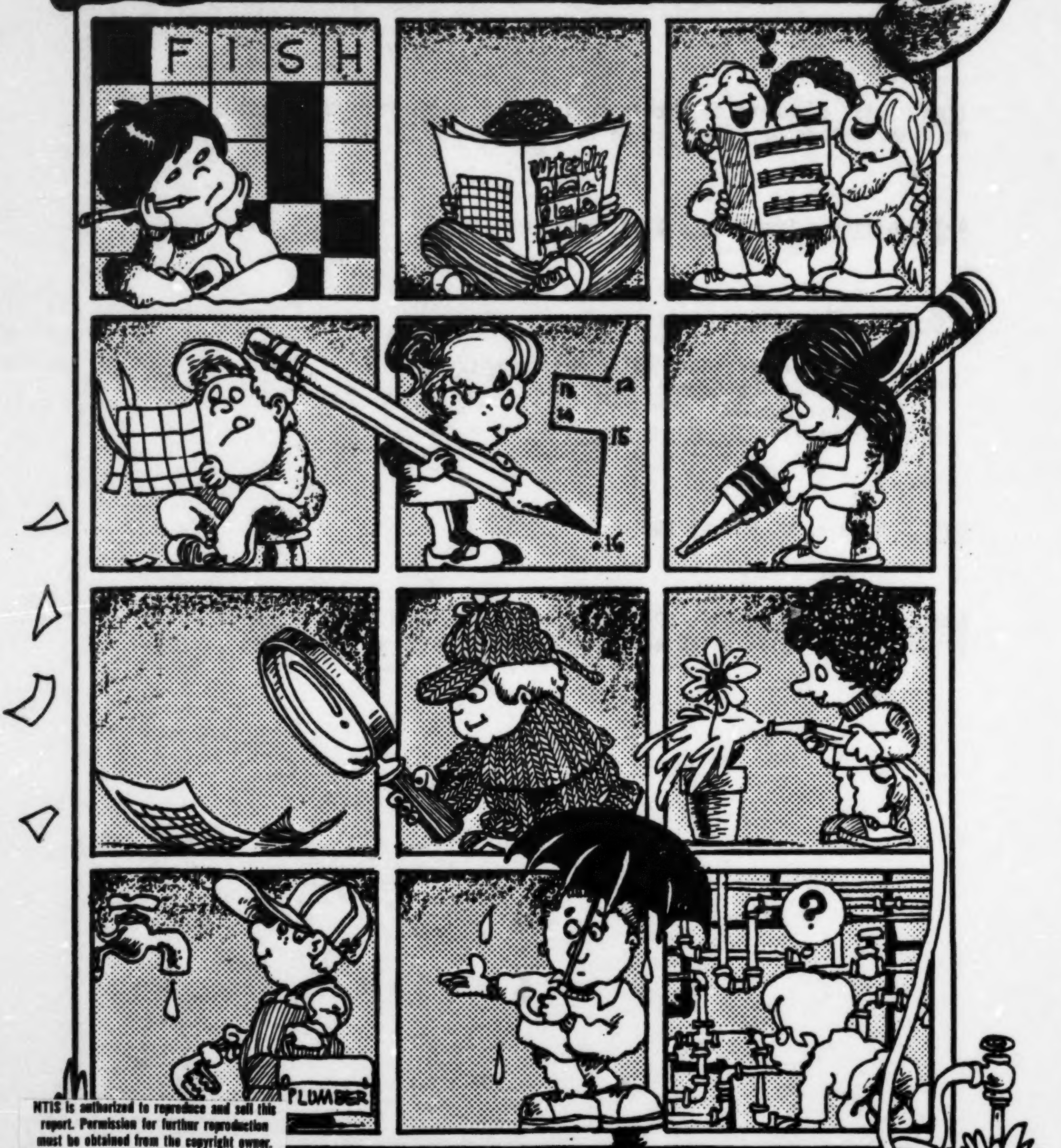
Illinois Interagency Water Management/
Conservation Committee
303 East Monroe
Springfield, IL 62706

Cost. None as of August 1981.

Additional Information. EPA appreciates the Committee's cooperation in granting permission to advertise the availability of this item.

TEACHERS GUIDE

Water Play


FISH
Water Play
13
12
14
15
16
?
PLUMBER
PAUL FRANK

NTIS is authorized to reproduce and sell this report. Permission for further reproduction must be obtained from the copyright owner.

©1978 EAST BAY MUNICIPAL UTILITY DISTRICT

PRESENTED BY: California Department of Water Resources, California Department of Education and Your Local Water Supplier

← East Bay Municipal Utility District

Items. Workbook and Teacher's Guide for Primary School Students (bearing East Bay MUD copyright):

- "Water Play"
- "Water Play Teacher's Guide"

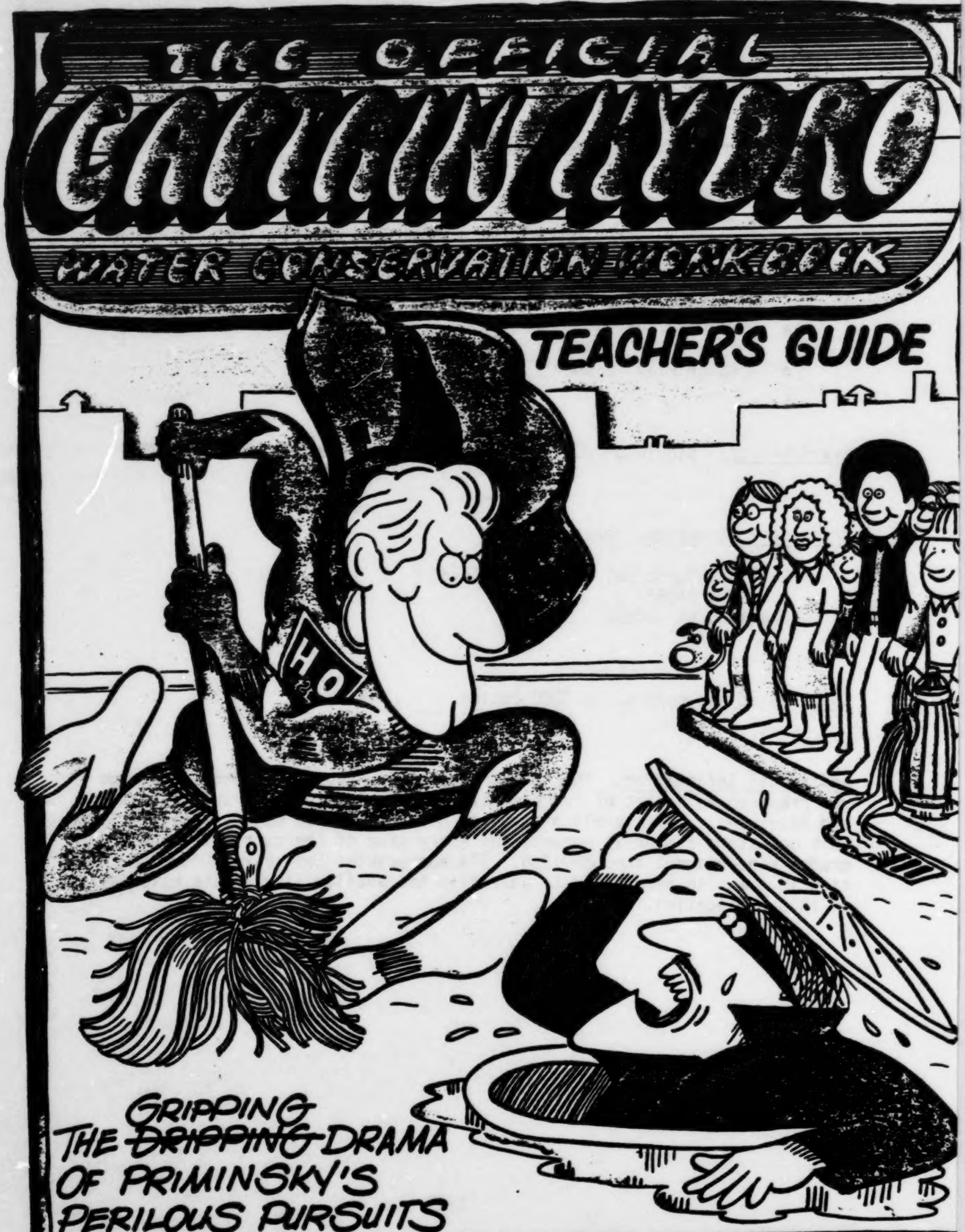
Availability. Single or multiple copies available as of November 1981.

Ordering Information. Write to:

East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623

Cost. $.35 per copy up to 5000 copies.

Additional Information. This primary school workbook and teacher's guide was prepared as a part of Project WATER (Water Awareness Through Education and Research). The overall program is not intended to be a separate science unit on water; rather it encompasses every area of the curriculum and spans grades Kindergarden through 12th. EPA appreciates East Bay MUD's cooperation in granting permission to advertise the availability of its material in this publication.


THE OFFICIAL
CAPTAIN HYDRO
WATER CONSERVATION WORKBOOK
TEACHER'S GUIDE
H_2O
THE GRIPPING ~~DRIPPING~~ DRAMA
OF PRIMINSKY'S
PERILOUS PURSUITS

← East Bay Municipal Utility District

Items. Workbook and Teacher's Guide for Upper Elementary School Students (bearing East Bay MUD's copyrights):

- "The Official Captain Hydro Water Conservation Workbook".
- "The Official Captain Hydro Water Conservation Workbook Teacher's Guide."

Availability. Single or multiple copies available in English or Spanish as of November 1981.

Ordering Information. Write to:

East Bay Municipal Utility District
P.O. Box 24055
Oakland, CA 94623

Cost. $.35 per copy up to 5000 copies.

Additional Information. This upper elementary school workbook and teacher's guide was prepared as a part of Project WATER (Water Awareness Through Education and Research). The overall program is not intended to be a separate science unit on water; rather it encompasses every area of the curriculum and spans grades Kindergarden through 12th. A complete list of materials is available on request.